September 1926 Entomological Series Vol. IX, No. 6

LIBRARY, ROYAL BOTANIC GARDENS, KEW

Memoirs of the Department of Agriculture in India

Studies on Indian Thysanoptera

BY

H. H. KARNY,

Buitenzorg—Dutch East Indies

AGRICULTURAL RESEARCH INSTITUTE, PUSA

Calcutta: Government of India
Central Publication Branch
1926

Price Re. 1-8 or 2s. 6d.

ROYAL BOTANIC GARDENS
C. 28-12-26.
KEW

EDITED BY

The Council of the Pusa Agricultural Research Institute which is not, as a body, responsible for the opinions expressed in the Memoir.

September 1926 Entomological Series Vol. IX, No. 6

Memoirs of the Department of Agriculture in India

Studies on Indian Thysanoptera

BY

H. H. KARNY,

Buitenzorg—Dutch East Indies

AGRICULTURAL RESEARCH INSTITUTE, PUSA

Calcutta: Government of India
Central Publication Branch
1926

Government of India Publications are obtainable from the Government of India Central Publication Branch, 8, Hastings Street, Calcutta, and from the following Agents :—

EUROPE.

OFFICE OF THE HIGH COMMISSIONER FOR INDIA,
42, GROSVENOR GARDENS, LONDON, S.W. 1.
And at all Booksellers.

INDIA AND CEYLON.

Provincial Book Depôts :

MADRAS :—Office of the Superintendent, Government Press, Mount Road, Madras.
BOMBAY :—Superintendent, Government Book Depôt, Town Hall, Bombay.
SIND :—Library attached to the Office of the Commissioner in Sind, Karachi.
BENGAL :—Office of the Bengal Secretariat Book Depôt, Writers' Buildings, Room No. I, Ground Floor, Calcutta.
UNITED PROVINCES OF AGRA AND OUDH :—Office of the Superintendent of Government Press, United Provinces of Agra and Oudh, Allahabad.
PUNJAB :—Office of the Superintendent, Government Printing, Punjab, Lahore.
BURMA :—Office of the Superintendent, Government Printing, Burma, Rangoon.
CENTRAL PROVINCES AND BERAR :—Office of the Central Provinces Secretariat, Nagpur.
ASSAM :—Office of the Superintendent, Assam Secretariat Press.
BIHAR AND ORISSA :—Office of the Superintendent, Government Printing, Bihar and Orissa, P. O. Gulzarbagh, Patna.
COORG :—Office of the Chief Commissioner of Coorg, Bangalore.
NORTH-WEST FRONTIER PROVINCE :—Office of the Manager, Government Printing and Stationery, Peshawar.

Thacker, Spink & Co., Calcutta and Simla.
W. Newman & Co., Ltd., Calcutta.
R. Cambray & Co., Calcutta.
S. K. Lahiri & Co., Calcutta.
The Indian School Supply Depôt, 309, Bow Bazar Street, Calcutta, and 226, Nawabpur, Dacca.
Butterworth & Co. (India), Ltd., Calcutta.
Rai M. C. Sarcar Bahadur & Sons, 90-2A, Harrison Road, Calcutta.
The Weldon Library, 17, Park Street, Calcutta.
Standard Literature Company, Limited, Calcutta.
Association Press, Calcutta.
Chukervertty, Chatterjee & Co., Ltd., 13, College Square, Calcutta.
The Book Company, Calcutta.
James Murray & Co., 12, Government Place, Calcutta. (For Meteorological Publications only.)
Roy Chaudhury & Co., 68/5, Russa Road, North, Calcutta.
Higginbotham & Co., Madras.
V. Kalyanarama Iyer & Co., Madras.
P. R. Rama Iyer & Co., Madras.
Rochouse and Sons, Madras.
G. A. Nateson & Co., Publishers, George Town, Madras.
The Modern Stores, Salem, Madras.
Bright & Co., Trivandrum.
The Booklover's Resort, Taikad, Trivandrum, South India.
V. S. Swaminathan, Bookseller, West Tower Street, Madura.
E. M. Gopalakrishna Kone, Pudumandapam, Madura.
Vijapur & Co., Vizagapatam.
Thacker & Co., Ltd., Bombay.
D. B. Taraporevala, Sons & Co., Bombay.
Sunder Pandurang, Bombay.
Ram Chandra Govind & Sons, Kalbadevi, Bombay.
N. M. Tripathi & Co., Booksellers, Princess Street, Kalbadevi Road, Bombay.
R. B. Umadikar & Co., The Bharat Book Depôt, Dharwar.
Proprietor, New Kitabkhana, Poona.
The Manager, Oriental Book Supplying Agency, 15, Shukrawar, Poona City.
R. S. Gondhalekar's Book Depôt, Publisher and Bookseller, Budhwar Chawk, Poona City.
Managing Director, Co-operative Bookstall, Booksellers and Publishers, Poona City.
The Standard Bookstall, Karachi, Quetta, Delhi, Murree and Rawalpindi.
J. Ray & Sons, 43 K. & L. Edwardes Road, Rawalpindi.
The Standard Bookstall, Quetta.
The Standard Book Depôt, Lahore, Lucknow, Nainital, Mussoorie, Dalhousie and Ambala Cantonment.
Karsandas Narandas & Sons, Surat.
Mangaldas & Sons, Booksellers and Publishers, Bhaga Talao, Surat.
Mrs. Radhabhai Atmaram Sagoon, Kalbadevi Road, Bombay.
A. H. Wheeler & Co., Allahabad, Calcutta and Bombay.
The Karachi Book Depôt, Karachi.
N. B. Mathur, Supdt., Nazir Kanun Hind Press, Allahabad.
The North India Christian Tract and Book Society, 18, Clive Road, Allahabad.
Ram Dayal Agarwala, 184, Katra, Allahabad.
Manager, Newal Kishore Press, Lucknow.
The Upper India Publishing House, Ltd., 41, Aminabad Park, Lucknow.
Munshi Seeta Ram, Managing Proprietor, Indian Army Book Depôt, Juhi, Cawnpore.
Rai Sahib M. Gulab Singh & Sons, Mufid-i-Am Press, Lahore and Allahabad.
Rama Krishna & Sons, Booksellers, Anarzali, Lahore.
Puri Brothers,, Booksellers and Publishers, Katcheri Road, Lahore.
The Tilak School Bookshop, Lahore.
The Standard Bookstall, Lahore.
Manager of the Imperial Book Depôt, 63, Chandni Chawk Street, Delhi.
Oxford Book and Stationery Company, Delhi.
Supdt., American Baptist Mission Press, Rangoon.
Proprietor, Rangoon Times Press, Rangoon.
The Modern Publishing House, Ltd., 30, Phayre Street, Rangoon.
The International Buddhist Book Depôt, Post Box No. 971, Rangoon.
Burma Book Club, Ltd., Rangoon.
Manager, the "Hitavada," Nagpur.
Bhisey Brothers, Booksellers and Stationers, Sitabaldi, Nagpur.
S. C. Talukdar, Proprietor, Students & Co., Cooch Behar.
Times of Ceylon Co., Ltd.
The Manager, Ceylon Observer, Colombo.
The Manager, The Indian Book Shop, Benares City.
B. C. Basak, Esq., Proprietor, Albert Library, Dacca.
The Srivilliputtur Co-operative Trading Union, Ltd., Srivilliputtur (Satur, S.I.R.).
Banwari Lal, Esq., Pakariya Street, Pilibhit, United Provinces.
The Manager, Educational Book Depôt, Jubbulpore.
Raghunath Prasad & Sons, Patna City.
Dandekar Brothers, Indore City.
The Hyderabad Book Depôt, Chaderghat, Hyderabad (Deccan)

STUDIES ON INDIAN THYSANOPTERA.

BY

H. H. KARNY,

Buitenzorg—Dutch East Indies.

(Received for publication on 31st August 1925.)

The present paper is a report on a collection of Thysanoptera from South India received by the author from Mr. Ramakrishna Ayyar and Rao Sahib Y. Ramachandra Rao, to both of whom he is much indebted for giving him the occasion to study this very interesting material. It adds considerably to the knowledge of the Thysanopterous fauna of India ; for, in this collection there are represented 50 different species, 18 of which are new to science and 4 must be considered as representing even new genera. The types are preserved in the author's collection, whilst available co-types were returned to the Agricultural Research Institute, Coimbatore.

The greater part of the present material was collected by Mr. T. V. Ramakrishna Ayyar whose name is well known to all students of Thysanoptera and who is the pioneer worker on this group in India. Already several years ago he sent valuable material to Mr. Bagnall and to Mr. Hood, both of whom have described some new species from his collections. Thus, it was especially valuable for me that I got from him also co-types or topotypes of these species for my studies. Moreover, he has now discovered many new species which will be described below. He may be congratulated on his great success in his work, and I hope that this will encourage him to continue his important studies on Thysanoptera in future also. Further, Rao Sahib Y. Ramachandra Rao has collected some Thysanoptera especially in Lantana flowers, in connection with his work on insects attacking Lantana. Finally, I also got some interesting specimens collected by Mr. A. G. Ramaswamiah and Mr. C. K. Subramanyam. All this material will be treated in the following paper, and the collectors' names are inserted with every species. Thus, I give here a practically complete record on the Thysanoptera known hitherto from South India for the present and I hope this paper will incite the Entomologists of India to collect further as many Thysanoptera as possible so that our knowledge thereon may be enriched again and again in future too. Especially owing to the ardent collecting work of Mr. Ramakrishna Ayyar, we know more on

Thysanoptera from South India than from most other tropical countries ; nevertheless, there can be no doubt that many new species would still be discovered in the future.

TEREBRANTIA.

Limothrips cerealium Haliday.

Head and prothorax of one specimen, from *Mimusops elengi*, August 3, 1923, Coimbatore ; probably occurred accidentally among many specimens of *Arrhenothrips ramakrishnae*, Hood ; A. G. Ramaswamiah coll. (T. V. R. No. 51.)

Maxillary palpi 2-segmented.

Hydatothrips ramaswamiahi, n. spec.

(Plate XVI, figs. 1-3.)

♀, ♂. Head dark grey-brown, occiput behind the eyes well defined, yellow, with transverse net-sculpture. First and second antennal joints yellow, second somewhat darker than first ; third joint yellowish grey, not darker than the preceding ones ; fourth joint yellowish grey in basal third, beyond that dark grey ; following joints dark grey throughout. Disc of pronotum along sides and anterior margin yellow, with transverse net-sculpture ; remaining part of disc well defined dark grey-brown, strongly chitinized. Pterothorax dark grey brown above, especially in the middle region ; pleurae orange yellow. Sterna pale yellow around the coxae ; remaining part of mesosternum dark grey brown in posterior half, paler yellow brown in forepart ; metasternum on each side of the Y-suture with a large, transverse, well defined, very dark grey-brown patch, rest of it orange yellow, the space in the middle in front of the Y-suture lemon yellow. All coxae very dark grey-brown, femora brownish yellow, tibiae slightly paler, tarsi pale greyish yellow. Wings greyish infumate, hind pair especially so along median vein ; fore pair with a large hyaline cross band near base, distad from the scale. Abdomen brownish yellow, tergites slightly infumate, especially those of segments 2 and 3 ; seventh to ninth segments very dark brown, almost black ; apical segment somewhat paler brown.

Head much wider than long. Eyes somewhat protruding, occupying more than half the length of head. Ocelli arranged in an obtuse-angular triangle. Antennae (Fig. 1 a) slender; 2nd joint ovate, strongly rounded, wider than the others. Sense cones of segments 3 and 4 united at base, of the usual horse-shoe shape and about half as long as the segments themselves.

Mouth cone bluntly pointed, extending slightly beyond the hind margin of prosternum. Maxillary palpi long, moderately slender, basal joint longer and thicker

than the others, apical joint longer and slightly narrower than second. Labial palpi much reduced, short and very thin.

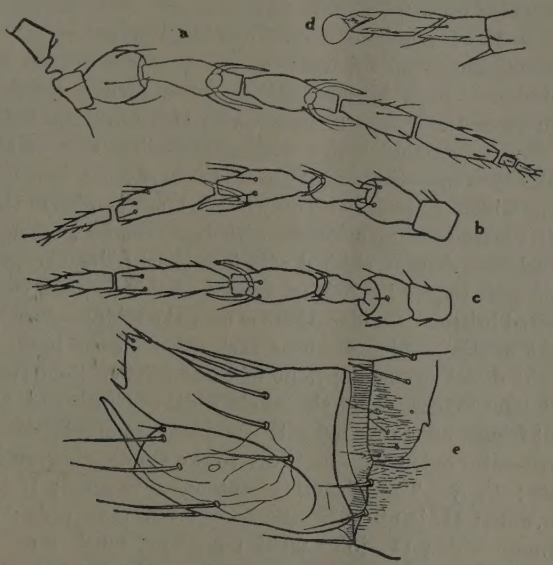


FIG. 1. *Hydatothrips ramaswamiahi*, n sp.—*a* normal antenna ; *b* anomalous antenna, ♂ ; *c* anomalous antenna, ♀ ; *d* hind tarsus, ♂ ; *e* end of ♂ abdomen, lateral view.

Prothorax longer and wider than head, rounded. No bristles near the angles. The strongly chitinized postero-median part with fine transverse striæ, visible only under high magnification, set with a few short, hair-like bristles on disc and along all margins.

Pterothorax hardly wider than long, fore and hind angles rounded, sides of mesothorax slightly arched, somewhat diverging backwards ; those of metathorax parallel. Mesoscutum with transverse striation, set with 6 bristles which are arranged on either half in the shape of an irregular triangle. Metascutum longitudinally striated and set, close to the fore margin, on either side, with two even longer and stronger bristles Mesosternum transversely truncate behind, with a sharp longitudinal suture along the entire length of the strongly chitinized mesosternal plate, which is crossed by a U-shaped endothoracic invagination. Sutures of metasternum Y-shaped, but the oblique branches of Y semi-circularly rounded, and the vertical, longitudinal shaft doubled.

All coxæ large, globose. Legs long and slender, especially the hind pair, with extraordinarily long, and articulately inserted tarsi (Fig. 1 d).

Wings reaching the penultimate or the apical abdominal segment, set with long fringe hairs along either margin ; entire surface densely clothed with very short

hairs, visible only under high magnification. Forewing broad in basal part, strongly constricted before the middle, where the foremargin is concave ; beyond that of equal width throughout up to the bluntly pointed apex. Fore margin set with about 25 bristles between the fringe-hairs ; only one longitudinal vein, set throughout the whole length with about 30 bristles ; in the pale cross band near the base is an interval of about 1 or 2 bristle-lengths. Scale with 4 bristles along foremargin, and 1 on surface near base ; apex, as in *Megalurothrips setipennis*, with 2 sense-cone-like structures. Hind wings with one median vein, without bristles.

Abdomen wider than pterothorax in ♀, narrower in ♂ ; in ♀ less, in ♂ more than 2½ times as long as wide. Lateral parts only of the hind margins of the tergites 1-6, and the entire hind margins of pleurites set with dense comb-like fringes ; the entire surface of these sclerites densely clothed with fine, short hairs, except on the dorsomedian region of each tergite ; on either border of this hairless region there is a backwardly directed bristle. Besides, there is near the middle of each tergite a pair of strong straight bristles, which are near each other on the basal segments and wider apart on the distal segments ; none of these bristles S-curved ! Tergites 7 and 8 fringed at hind margin along the whole width. Ninth and tenth segments (Fig. 1 e) without fringe, but furnished with some long, strong bristles in both sexes. Basal bows of ovipositor extending anteriorly to the middle of seventh segment.

Measurements ; ♀, ♂. Total length of antenna 0·28 mm. ; I. joint 0·02 mm. long, 0·023 mm. wide ; II. joint 0·035 mm. long, 0·027 mm. wide ; III. joint 0·06 mm. long, 0·02 mm. wide ; IV. joint 0·056 mm. long, 0·017 mm. wide ; V. joint 0·043 mm. long, 0·015 mm. wide ; VI. joint 0·052 mm. long, 0·014 mm. wide ; VII. joint 0·008 mm. long, 0·004 mm. wide ; VIII. joint 0·011 mm. long, 0·003 mm. wide. Head 0·07 mm. long, 0·15 mm. wide. Prothorax (incl. forecoxae) 0·13 mm. long, 0·20 mm. wide. Forefemora 0·14 mm. long, 0·045 mm. wide ; foretibiæ (incl. tarsi) 0·22 mm. long, 0·04 mm. wide. Pterothorax 0·23 mm. long, 0·25 mm. wide. Middle femora 0·14 mm. long, 0·04 mm. wide ; middle tibiæ (incl. tarsi) 0·24 mm. long, 0·035 mm. wide. Hind-femora 0·17 mm. long, 0·04 mm. wide ; hindtibiæ (incl. tarsi) 0·32 mm. long, 0·04 mm. wide. Length of wings (without fringe) 0·7 mm. Abdomen ♀ 0·68 mm. long, 0·29 mm. wide ; ♂ 0·50 mm. long, 0·18 mm. wide. *Total length* ♀ 0·9-1·3 mm., ♂ 0·7-1·1 mm.

Described from several ♀♀ and ♂♂ taken at Coimbatore from Indigo leaves Sept. 6, 1923, by Mr. A. G. Ramaswamiah, in whose honour I have named it. **(T. V. R. No. 45.)**

Larva yellow, abdominal segments furnished with fan-shaped bristles.

Tryphactothrips mundus, n. spec.

(Plate XVI, fig. 4.)

♀. Very similar in colour and morphological characters to the Sumatran *T. mediosignatus*, but without the dark, blackish infumation on tergite 1 and base of

tergite 2 ; the proportions of antennal segments (Fig. 2 a) are also somewhat different. Ocelli wider apart from one another than in *mediosignatus ;* surface of head between eyes with distinct, though irregular reticulation, occiput behind the eyes with widely separated transverse striæ. Palpi (Fig. 2 b) short and thin. Hind margin of prothorax with 8 short, rather equidistant bristles, which are neither longer nor stouter than those on dorsal surface of the disc. Mesoscutum with transverse, metascutum with longitudinally arranged net-sculpture. Wings coloured and bristled as in *mediosignatus*. Hind margins of abdominal segments without comb-like fringe. Tergites set with many short, thin, but strong bristles, as in *mediosignatus ;* only a narrow dorso-median longitudinal stripe is free from them, and smooth. Bristles of dorso-median pair wider apart from each other than in the preceding species, slightly curved and directed mesad ; on segments 2 to 4 short and hair-like, on segment 5 as long as the distance between their tips, on the following segments strong, slightly S-curved, much longer and crossing each other at the tips (Fig. 2 c) ; on segment 8 two pairs of such bristles present. By their shape and position they remind us of the wing-retaining spines of Tubulifera, especially of *Leeuwenia*, and may fulfill perhaps the same function (convergent adaptation !). All other characters as in *mediosignatus*.

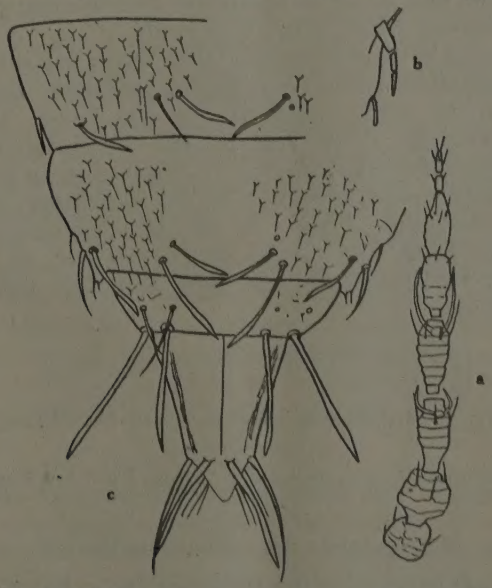


Fig. 2. *Tryphactothrips mundus* ♀ ; *a* antenna ; *b* palpi ; *c* end of abdomen

Measurements, ♀. Total length of antenna 0·25 mm. ; I. joint 0·02 mm. long, 0·025 mm. wide ; II. joint 0·035 mm. long, 0·03 mm. wide ; III. joint 0·045 mm.

long, 0·02 mm. wide ; IV. joint 0·045 mm. long, 0·02 mm. wide ; V. joint 0·04 mm. long, 0·017 mm. wide ; VI. joint 0·04 mm. long, 0·013 mm. wide ; VII. joint 0·01 mm. long, 0·005 mm. wide ; VIII. joint 0·013 mm. long, 0·003 mm. wide. Head 0·09 mm. long, 0·15 mm. wide. Prothorax 0·12 mm. long, 0·19 mm. wide. Fore-femora 0·10 mm. long, 0·06 mm. wide ; fore tibiæ (incl. tarsi) 0·15 mm. long, 0·04 mm. wide. Pterothorax 0·25 mm. long, 0·27 mm. wide. Middle femora 0·09 mm. long, 0·045 mm. wide ; middle tibiæ (incl. tarsi) 0·14 mm. long, 0·04 mm. wide. Hind femora 0·14 mm. long, 0·055 mm. wide ; hind tibiæ (incl. tarsi) 0·19 mm. long, 0·04 mm. wide. Length of wings (without fringe) 0·55 mm. Abdomen 0·75 mm. long, 0·30 mm. wide. ***Total length*** 1·0-1·2 mm.

Described from 5 ♀♀ taken at Taliparamba, Malabar, 16 September 1918, by Mr. Ramakrishna Ayyar, coll. No. XVI ; causing small galls on leaves of a wild plant.

Rhipiphorothrips cruentatus, Hood.

(Plate XVI, fig. 6.)

In the collection this species is represented by numerous specimens of both sexes from the following localities and food plants :—

Palur, S. Arcot, on leaves of *Odina odiar*, Octr. 1918 ; Ramakrishna Ayyar coll. No. XIX.—Maddur, Mysore, on leaves of *Eugenia jambulana*, Ramakrishna Ayyar 2 Septr. 1918, coll. No. XXI.—Coimbatore, on rose leaves, Aug. 3rd 1923, Y. Ramachandra Rao coll. No. 5. (T. V. R. No. 48.)—Coimbatore, on rose leaf, Aug. 3rd 1923, Y. Ramachandra Rao coll. No. 7.—Coimbatore, in *Calotropis* flowers, Feb. 15th 1924, Ramakrishna Ayyar coll. No. 39.—Coimbatore, on *Eugenia* leaves, Feb. 15th 1924, Ramakrishna Ayyar coll. No. 42.—Coimbatore, on grape vine leaf, Ramakrishna Ayyar coll. cotypes of material sent to Hood in 1916.—Lyallpur, Punjab, Afzal Husain, coll. No. 2146, April 24th 1923, from Imperial Bureau of Entomology.

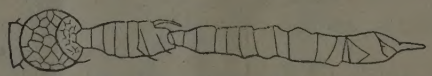


Fig. 3. *Rhipiphorothrips cruentatus* ♀, anomalous antenna.

Fig. 3 shows an anomalous antenna of a ♀ from No. 7 (on Rose leaf).

Heliothrips haemorrhoidalis Bouche.

Several specimens from Coimbatore and Bangalore, on leaves of garden crotons, " sometimes causing serious damage to the foliage," January 1921, Ramakrishna Ayyar coll. No. X —1 ♀ from Coimbatore 18th August 1918, in shoots of " *nim* " (*Melia azadarichta*), Ramakrishna Ayyar coll. No. XI.

HELIOTHRIPS INDICUS, BAGNALL.

(Plate XVI, fig. 5.)

Several specimens from Bombay, on cabbage leaves, T. V. R. No. IX.

AYYARIA, N. GEN.

Body neither unusually slender, nor extraordinarily broad. Head not produced in front of eyes, occiput with some wide apart, partly confluent, transverse striæ. Antennæ long and very slender, 8-segmented, style much shorter than the preceding joint. Mouth cone of usual length and shape ; maxillary palpi 2-segmented. Thorax without net-sculpture. Prothorax with one long (anteromarginal) bristle, mesad from fore angle, and two similar ones near each hind angle ; anterolaterals, some bristles along lateral margin, and one pair near the middle of hind margin short ; remaining surface smooth, not clothed with short hairs. Fore tibiæ unarmed. Wings present, normally shaped ; fore pair with two rows of unusually long and strong bristles, arranged along the very inconspicuous veins. Lateral portions of abdominal tergites with distinct polygonal net-sculpture, though less strongly arranged than in *Heliothrips haemorrhoidalis*. Hind margin of segments entire, except on segment 8 where it is furnished with a strong comb-like fringe. Apical segments not unusually narrowed nor tubiform.

This new genus is named in honour of its discoverer, Mr. Ramakrishna Ayyar. It may be distinguished from the members of the Heliothripinæ by the long bristles of prothorax, and as such it must be placed in the Thripinæ. In this group, it agrees with *Diarthrothrips*, Williams in the two jointed maxillary palpi, but differs in having long anteromarginal bristles and the surface of prothorax not clothed with short hairs. This latter character distinguishes it also from *Parafrankliniella*, Priesner with which it agrees in the presence of very long bristles mesad from anterior prothoracic angles ; it also differs from the latter in having 2-jointed maxillary palpi. Thus, it cannot be confused with any of the hitherto known genera.

AYYARIA CHAETOPHORA, N. SPEC.

(Plate XVII, fig. 1.)

♀. General colour uniformly grey brown. First and second antennal joints darker than head, second slightly paler distad ; third to fifth joints very pale greyish, almost hyaline, third slightly shaded wth grey before apex, fourth grey—in preapical fourth, fifth in apical half ; sixth joint grey, with basal third nearly hyaline ; style grey. All femora slightly paler than the body, very pale yellowish grey at base and knee. Tibiæ and tarsi very pale yellowish grey, fore tibiæ infumate along both margins. Fore wings hyaline, with dark crossbands in second and fourth fifths.

Head with a pair of long bristles behind anterior ocellus, as in *Parafrankliniella* and *Diarthrothrips*. Postocular bristles practically wanting. Antennæ (Fig. 4 a) very slender and long. Joints one to five with moderately long, thick, stiff bristles; those on sixth and style shorter, hair-like. Sense-cones of joints 3 and 4 of usual shape, very thin, hardly half as long as the joints. Maxillary palpi (Fig. 4 b) 2-jointed, basal joint thicker and shorter than the apical one.

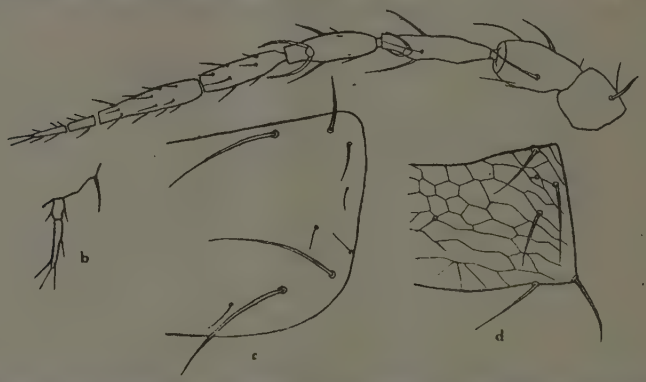


FIG. 4. *Ayyaria chaetophora*, n. gen. and spec. ♀; *a* antenna; *b* maxillary palpus; *c* chaetotax of prothorax; *d* chaetotaxy of third abdominal segment.

Prothorax (Fig. 4 c) as stated in the description of the genus. Wings reaching the hind margin of 8th abdominal segment, with long fringe along both margins. Bristles of fore wings very long and stout, conspicuously longer than breadth of the wing, those in the dark cross bands dark, the others pale. *Chaetotaxy:* costa 18; chief vein 10; lower vein 3, the first of which is in the middle of wing; scale 3 and the 2 sense-cones at apex as in *Hydatothrips ramaswamiahi*.

Abdominal segments (Fig. 4 d) structure and chaetotaxy as described for the genus. Apical half of 9th segment set with 3 cross-rows of long, stout bristles, reaching the apex of following segment. This latter segment is also provided with some similar, but slightly thinner, bristles of nearly the same length.

Measurements, ♀. Total length of antenna 0·38 mm.; I. joint 0·03 mm. long, 0·033 mm. wide; II. joint 0·05 mm. long, 0·03 mm. wide; III. joint 0·08 mm. long, 0·015 mm. wide; IV. joint 0·06 mm. long, 0·015 mm. wide; V. joint 0·055 mm. long, 0·015 mm. wide; VI. joint 0·07 mm. long, 0·013 mm. wide; VII. joint 0·017 mm. long, 0·007 mm. wide; VIII. joint 0·022 mm. long, 0·004 mm. wide. Length of head 0·13 mm., of prothorax 0·13 mm. Fore femora 0·15 mm. long, 0·06 mm. wide; fore tibiæ (incl. tarsi) 0·23 mm. long, 0·045 mm. wide. Length of pterothorax 0·16 mm. Middle femora 0·15 mm. long, 0·05 mm. wide; middle tibiæ (incl. tarsi) 0·23 mm. long, 0·045 mm. wide. Hind femora 0·18 mm. long, 0·05 mm. wide; hind

tibiæ (incl. tarsi) 0·34 mm. long, 0·045 mm. wide. Length of wings (without fringe) 1·0 mm. Length of abdomen 1·1 mm. *Total length* 1·5 mm.

1 ♀ from Taliparamba, Malabar, inside flowers of Cow-pea (*Vigna catiang*), Ramakrishna Ayyar coll. No. XXII, 18th Septr. 1918.

Scolothrips 6-maculatus, Pergande.

2 ♀♀, 1 ♂ from Coimbatore, Sept. 1st 1923, on pomegranate flowers, A. G. Ramaswamiah coll. No. 4. (T. V. R. No. 47.) The specimens were compared with those from North America and Europe (in my collection).

Frankliniella sulphurea, Schmutz.

(Plate XVII, fig. 2.)

There are, in the collection before me, many ♀ specimens (no ♂♂ !) of a *Frankliniella* which must be identified with Schmutz's species. From this material, I can complete Schmutz's description by giving the following characters :—

General colour of body sulphur yellow in pale specimens, orange yellow in dark specimens. Distal part of abdomen never darker than the pterothorax, usually even paler. Antennæ (Fig. 5) sometimes pale throughout, except the 6th joint and the style, which are always dark grey. 2nd joint as pale as the 1st, often slightly darker and greyish infumate, and sometimes abruptly ferrugineous at apical margin. Joints 3 to 5 usually more or less greyish infumate, especially distad, in the 3rd less, and in the 5th more than in the 4th. Length of bristles (in μ) : postoculars 25—30, anterolaterals 45---60, posterolaterals 60—70, those on penultimate abdominal segment 90—100. Wings reaching the 7th, 8th or even 9th abdominal segment, usually hyaline, sometimes slightly greyish infumate. Chaetotaxy of fore wings : costa 19—24, upper vein 17-20, lower vein 13—16.

Fig. 5. *Frankliniella sulphurea* Schmutz, *a* normal antenna of a ♀ from *Lablab* ; *b* normal antenna of a ♀ from *Lantana* flowers ; *c* anomalous ("Ceratothripoid") antenna of a ♀ from *Crotalaria*.

Coimbatore, inside *Chrysanthemum* flowers, 13th August 1918, Ramakrishna Ayyar coll. No. XX.—Coimbatore, on *Lantana* flowers, Aug. 3rd 1923, Y. Ramachandra Rao coll. No. 1. (T. V. R. No. 44.) Coimbatore, *Bignonia grandis* flowers, Aug. 14th 1923, A. G. Ramaswamiah coll. No. 6. (T. V. R. No. 49.) Coimbatore, in lucerne flowers, Aug. 1923, Ramakrishna Ayyar coll. No. 24.—Coimbatore, in flowers of *Datura*, Septr. 1923, Ramakrishna Ayyar coll. No. 25.—Coimbatore, on *Hibiscus rosa-sinensis*, Septr. 1923, Ramakrishna Ayyar coll. No. 26.—Coimbatore, in lablab flowers, Feb. 15th 1924, Ramakrishna Ayyar coll. No. 41.

Taeniothrips distalis, Karny.

8 ♀♀ from Coimbatore, Feb. 15th 1924, on lablab flowers, Ramakrishna Ayyar coll. No. 41.

Taeniothrips longistylus, Karny.

(Plate XVII, figs. 3, 4.)

The only difference between this and the preceding species is the paler 3rd joint of antennæ ; thus, it is not improbable that *longistylus* may be no other than a colour variety of *distalis*.

General colour of ♂ practically as in ♀, but usually more or less paler ; very pale ♂♂ have a brownish yellow pronotum and abdomen, whilst head, pterothorax and apical abdominal segments (8 or 9 to 10) are darker brown.

One of the ♂♂ before me (Plate II, fig. 4) has both antennæ of ' Ceratothripoid " structure ; the same is the case with one antenna of 2 ♀♀, whilst the other one is normal.

It is not improbable that " *Frankliniella* " (!) *vitata*, Schmutz may be a paler specimen of *longistylus*, but this cannot be stated with certainty from the description only, because it is not sufficient, especially as to chætotaxy of wings.

Coimbatore, in red gram (*Cajanus indicus*) flowers, 3rd Jan. 1917 ; Ramakrishna Ayyar coll. No. V.—Coimbatore, in shoots of *Nim* (*Melia azadarichta*), 18th Aug. 1918, Ramakrishna Ayyar coll. No. XI.—Coimbatore, in sunnhemp flowers (*Crotalaria juncea*), 13th Sept. 1918, Ramakrishna Ayyar coll. No. XII.—Taliparamba Malabar, inside flowers of cow-pea (*Vigna catiang*), 18th Sept. 1918, Ramakrishna Ayyar coll. No. XXII.—Coimbatore, in lucerne flowers, Aug. 1923, Ramakrishna Ayyar coll. No. 24.

Physothrips minor, Bagnall.

(Plate XVII, fig. 5.)

This species, described already by Bagnall from Mr. Ramakrishna's material in 1921, is very similar, in general appearance, structure and colour of antennæ

and in chætotaxy of wings, to *Tæniothrips longistylus*, but is conspicuously smaller and without a hyaline cross band before apex of forewing.

Isoneurothrips orientalis, Bagnall.

(Plate XVII, fig. 6 ; Plate XVIII, fig. 1.)

I can complete Bagnall's description from the material before me by the following characters :—

5th antennal joint usually paler at extreme base, rarely dark throughout. Chætotaxy of forewings: costa 25—32 ; chief vein 17—18, *viz.*, 4+3+10—11, the distance between 3 and 10—11 about one bristle length or somewhat less, that between 4 and 3 still shorter ; lower vein 16—19, in ♂♂ usually less, sometimes 11 or 12 only ; scale 4 along fore margin, 1 on surface near base, 1 at apex. Colour of fore wings grey throughout, except a small, oblong-ovate, hyaline dot behind the space between the 3 and 10—11 bristles. Abdomen more or less linear in ♂, in ♀ varying in shape, usually more or less oblong-ovate, sometimes linear ; thus, the shape of abdomen cannot be used as specific character. ♂ abdomen, besides the pale areas described by Bagnall, furnished with two very long, curved, thick, dark, horn-like preapical bristles.

Fig. 6. *Isoneurothrips orientalis*, ♂ Lateral view of head.

Differing from *australis* by the dark colour (in both sexes !), from *setifer*, *parvispinosus* and *jenseni* by the forewings being not hyaline in basal part, from *multispinus* by much shorter interocellar bristles, from *parvispinus*, *jenseni*, *multispinus* and *australis*, moreover, by the long head.

Three of the specimens before me show an anomalous antenna, as figured above for *Hydatothrips ramaswamiahi* (Fig. 1 b, c) and *Frankliniella subflurea* (Fig. 5 c), but with the style shorter, 1-jointed, or entirely absent.

Numerous specimens in this collection from : Coimbatore, in flowers of *Morinda tinctoria*, 30th Apr. 1919, Ramakrishna Ayyar coll. No. VI.—Coimbatore, in flowers of Jasmine, Septr. 1923, Ramakrishna Ayyar coll. No. 27.

The species was known hitherto only from Sarawak.

THRIPS FLORUM, SCHMUTZ.

(Plate XVIII, figs. 2, 3.)

For synonymy see : Karny, *Ark. Zool.*, XVII A, 2, p. 13 ; 1924.

From the abundant material now before me, I can complete Schmutz's description as follows :—

♀.—Freshly emerged specimens orange yellow to ferrugineous, apical segments of abdomen always darker, grey brown ; then the whole abdomen becomes dark brown, head and thorax dark orange brown ; finally the whole body dark throughout. Antennæ uniformly dark, except the paler 3rd joint. Cheeks sculptured as in *kikuyuensis*. 8th abdominal segment as in *Kakothrips* or *Isoneurothrips*. Fore wings dark throughout or becoming slightly paler basad ; chief vein distad with 3 bristles, very rarely (1 ♀ and 1 ♂ in the whole material before me) 4.

♂ ("*Thrips sulphurea*," Schmutz).—Pale sulphureous to greyish or orange yellow. First and second antennal joints whitish hyaline, 2nd sometimes slightly darker, greyish. Following joints greyish, gradually becoming darker ; in dark specimens uniformly coloured, in pale specimens joints 4 and 5 paler in basal part than distad. Cheeks without distinct sculpture. Wings yellowish hyaline or slightly greyish ; chætotaxy as in ♀.

Some of the specimens before me show anomalous antennæ. In one antenna, there are joints 3+4 and 5+6, respectively, grown together. "Ceratothripid" antennæ are not uncommon : 3rd joint much smaller than usual, 4th of usual shape, then follows one joint shaped as the normal joint 6, then the normal style. This abnormality in one antenna occurs in several specimens, whilst the other antenna is quite normal. 1 ♂ and 1 ♀, however, have both antennæ of "Ceratothripid" structure ; thus, they should be placed in the "family *Ceratothripidæ*," but there cannot be any doubt that this family cannot stand, as it includes only Thripidæ with both antennæ anomalous.

Coimbatore, from the following food plants :—No. XII and XIV, sunn hemp flowers (*Crotalaria juncea*), and *Cumbu* ears (*Pennisetum typhoideum*), 13th Sep. 1918, Ramakrishna Ayyar coll.—No. 1, (T. V. R. No. 44) flowers of *Lantana*, Aug. 3rd 1923, Y. Ramachandra Rao col.—No. 2, on Indigo leaves, Sept. 6th 1923, A. G. Ramaswamiah coll.—No. 4, (T. V. R. No. 47) Pomegranate flowers, Sept. 1st 1923, A. G. Ramaswamiah coll.—No. 6, (T. V. R. No. 49) *Bignonia grandis* flowers, Aug. 14th 1923, A. G. Ramaswamiah coll.—No. 26, in flowers of *Hibiscus rosa-sinensis* Septr. 1923, Ramakrishna Ayyar coll.—No. 27, in Jasmine flowers, Sept. 1923, Ramakrishna Ayyar coll.—No. 37, from *Cæsalpinia pulcherrima* flowers, Sept. 23rd 1923, A. G. Ramaswamiah coll. No. 40, in Banana flowers, Feb. 15th 1924, Ramakrishna Ayyar coll.—No. 41, in Lablab flowers, Feb. 15th 1924, Ramakrishna Ayyar coll.—Further from Maddur, Mysore, on leaves of *Eugenia jambulana*, 2nd Septr. 1918, Ramakrishna Ayyar coll No. XXI, 1 ♀.

THRIPS PALMI, KARNY.

4 ♀♀ from Coimbatore, Feb. 15th 1924, Lablab flowers, Ramakrishna Ayyar coll. No. 41.

THRIPS TABACI, LINDEMAN VAR.

The few specimens before me differ from the typical *tabaci* by having only three distal bristles on upper vein of fore wing, as is also the case in Priesner's European varieties *flavosetosus* and *brevicornis* differing from *palmi* especially by the fifth antennal joint being pale basad.

4 ♀♀ from Coimbatore, in flowers and shoots of cotton, March 1920, Ramakrishna Ayyar coll. No. XV.—1 ♀ from Bombay, on cabbage leaves, No. IX.

THRIPS PARVUS, SCHMUTZ.

1 ♀ from Coimbatore in *Cæsalpinia pulcherrima* flowers, Sept. 23rd 1923, A. G. Ramaswamiah coll. (T. V. R. No. 37).

KEY TO THE SPECIES OF *MYCTEROTHRIPS*.

1. Lower vein of forewing with 10 or more bristles . 2.
   General colour orange yellow. Upper vein of forewings with 7(4+3)+3 bristles, lower vein only with 4 in all. (India). . . . . *M. setiprivus*, n. sp.
2. Apex of ♀ abdomen more or less conical. Upper vein of forewings in distal part with 4 bristles at least. (North America) . . . . . 3.
   Apex of ♀ abdomen broadly rounded. General colour whitish yellow. Upper vein of forewings with 8+2 bristles, lower vein with 14. (South Africa) *M. laticauda* Trybom.
3. General colour bright yellow. Upper vein of forewing with 19 bristles, lower vein with 22 . . . *M. floridanus* Watson.
   General colour brown. Upper vein of forewings with 7(3+4)+4 bristles, lower vein with 10 . . *M. longirostrum* Jones.

It is worthy of mention that all these four species of the genus were taken only from leguminous plants. (*Papilionaceæ*) and *Acacia* (*Mimosaceæ*). ♂♂ not yet known.

Mycterothrips setiprivus, n. spec.

(Plate XVIII, fig. 4.)

♀. Orange yellow, pterothorax somewhat darker than head and abdomen; tarsi paler yellowish. Ocelli with red pigment-cups. Wings uniformly greyish yellow, infumate, not cross-banded. First antennal joint pale greyish yellow, 2nd joint slightly more yellow; 3rd still darker yellow; 4th and 5th joints dark greyish yellow in basal half, dark grey distad; 6th joint and style very dark grey throughout.

Head slightly wider than long, obtuseangulately produced between antennæ, lateral margins slightly arched, converging backwards; about as long as the eyes. Anterior ocellus directed forwards; posterior ones nearly touching it and the inner margin of eyes, widely separated from each other. Eyes black, not protruding. Cheeks obtuscangulately produced close behind eyes, bearing here a very short postocular bristle (shorter than the diameter of an ocellus), further back smooth, not serrate. Occiput with some indistinct transverse striæ.

Antennæ (Fig. 7 a) hardly twice as long as head. First joint cylindrical, as long as wide; second joint broadly ovate, wider than all the others, one and a half times as long as the first; 3rd and 4th joints broadly clavate, 5th truncate at apex; 6th joint fusiform; style not very long, apical joint longer than the basal one.

Bristles of joints 2 to 5 longer and stouter than usual. Sense-cones of usual shape, on 3rd and 4th joint reaching somewhat over the tip of the distal bristles.

Mouth-cone (Fig. 7 b) very much tapering distad, long and pointed, extending beyond the hind margin of prosternum. Maxillary palpi three-segmented, long and not very slender, not reaching the hind margin of prosternum; first joint longer and thicker than the following ones, 2nd shorter and thicker than the 3rd. Labia palpi small, about as long as and half as wide as the 2nd maxillary palpa joint.

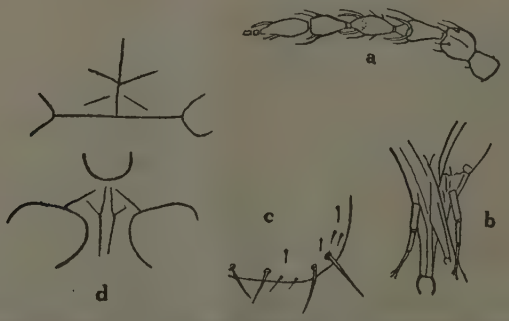


Fig. 7. *Mycterothrips setiprivus*, ♀, *a* antenna; *b* mouth cone; *c* hind part of prothorax, chaetotaxy; *d* structures of meso and metasternum.

Prothorax somewhat longer and wider than head, with two stout bristles near the hind angles ; these are about one fourth or fifth of the whole prothorax in length (Fig. 7 c). Between them along the hind margin are 6 short bristles, the median pair being the longest. Anterior angle with a short, forward directed bristle ; and some similar bristles, backwardly directed, are found all over the whole surface, especially along lateral margins. All these bristles not longer than the shorter ones of hind margin.

Pterothorax somewhat longer than wide, with sides of each segment arched. (Sternal sutures Fig. 7 d). Legs stout, unarmed ; hind tibiæ rather long.

Wings reaching the seventh abdominal segment, the whole surface closely set with very short hairs which are visible under high magnifications only. Bristles of veins about half as long as the width of wings near the middle, those on fore margin slightly longer. Chætotaxy : costa about 25 ; chief vein 7 basad (4+3), 3 distad ; lower vein 4 in all, the first of which inserted close behind the last premedial bristle of upper vein. Hind wings much narrower than the fore pair, with an indistinct median longitudinal vein.

Abdomen somewhat wider than pterothorax, two and a half times as long as wide, conically pointed at apex. Bristles moderately long and thin. Those on penultimate and apical segments thick and stout, dark brown, and about as long as the last segment itself.

Measurements : Total length of antenna 0·21 mm.; I. joint 0·02 mm. long, 0·02 mm. wide ; II. joint 0·03 mm. long, 0·023 mm. wide ; III. joint 0·04 mm. long, 0·015 mm. wide ; IV. joint 0·038 mm. long, 0·017 mm. wide ; V. joint 0·03 long, 0·014 mm. wide ; VI. joint 0·038 mm. long, 0·013 mm. wide ; VII. joint 0·006 mm. long, 0·005 mm. wide ; VIII. joint 0·010 mm. long, 0·003 mm. wide. Head 0·11 mm. long, 0·12 mm. wide. Prothorax 0·14 mm. long, 0·17 mm. wide. Fore femora 0·08 mm. long, 0·05 mm. wide ; fore tibiæ (incl. tarsi) 0·13 mm. long, 0·03 mm. wide. Pterothorax 0·24 mm. long, 0·20 mm. wide. Middle femora 0·07 mm. long, 0·035 mm. wide ; middle tibiæ (incl. tarsi) 0·11 mm. long, 0·03 mm. wide. Hind femora 0·11 mm. long, 0·04 mm. wide ; hind tibiæ (incl. tarsi) 0·20 mm. long, 0·03 mm. wide. Length of wings (without fringe) 0·50 mm. Abdomen 0·60 mm. long, 0·24 mm. wide. *Total length* 1·1 mm.

1 ♀ from Coimbatore, in shoots of a wild legume, August 1923, Ramakrishna Ayyar coll. No. 32.

Anaphothrips oligochaetus, n. spec.

(Plate XVIII, fig. 5).

♀, ♂. Pale yellow, legs still paler, wings very pale greyish, almost uniformly hyaline. The margins between abdominal segments 3 to 7 very narrowly brown in ♀, concolourous in ♂. Antennal joints 1 and 2 whitish hyaline, 3rd uniformly greyish, 4th darker, 5th to style very dark brownish grey.

Head wider than long, with sides converging backwards ; fore margin above either antennal insertion roundly emarginate and between them obtuseangulately produced. Eyes black, somewhat protruding, shortly pilose between the facets, longer than the cheeks.

Antennæ slightly more than twice as long as the head, joints not very slender (Fig. 8). 2nd joint broadly rounded, much wider than all the following ones. 5th truncate at apex, broadly united with 6th. Bristles on second joint long and stout, weaker on the following ones. Sense-cones of 3rd and 4th joints moderately long, much shorter than in the tea-inhabiting species (*theiperdus* &c.).

FIG. 8. *Anaphothrips oligochaetus*, n. sp., ♀, antenna.

Mouth-cone triangular more or less equilateral rounded at apex, not reaching the hind margin of prosternum. Maxillary palpi moderately long, 3-segmented ; joints about equal in length, decreasing in width from 1 to 3. Labial palpi short and slender, not longer and even narrower than the apical joint of maxillary palpi.

Prothorax clothed with some short bristle-hairs ; those at the hind angles stronger than the others and in length about one-fifth of the prothorax. Fore legs set with dark bristles almost all over the surface ; femora somewhat incrassate, tibiæ and tarsi unarmed.

Pterothorax as long as wide or slightly longer. Sides of meso-and metathorax arched, the former being wider than the latter. Sternal sutures practically as in *Mycterothrips setiprivus*. Chætotaxy of middle and hind legs as stated above for the fore legs.

Wings reaching abdominal apex. Bristles of fore pair hardly half as long as the wing-width near the middle, those along fore margin longer and stronger. Chætotaxy : costa 22—28, upper vein (3—4+4—7)+(1+2) ; lower vein 1 to 2 in distal part ; scale 3—4 along fore margin, 1 on surface basad, 1 at apex.

Bristles of abdomen moderately long and stout, those on segments 9 and 10 longer than the apical segment itself. Basal bows of ovipositor not quite reaching the hind margin of 7th segment. 9th segment longer than the others, 10th rounded at apex in both sexes.

Measurements ; ♀, ♂ : Total length of antenna, 0·19 mm. ; I. joint 0·018 mm. long, 0·018 mm. wide ; II. joint 0·03 mm. long, 0·02 mm. wide ; III. joint 0·033 mm. long, 0·014 mm. wide ; IV. joint 0·033 mm. long, 0·014 mm. wide ; V. joint 0·028 mm. long, 0·013 mm. wide ; VI. joint 0·034 mm. long, 0·012 mm. wide ; VII. joint 0·006 mm. long, 0·006 mm. wide ; VIII. joint 0·009 mm. long, 0·004 mm. wide. Head 0·08 mm. long, 0·11 mm. wide. Prothorax 0·10 mm. long, 0·14 mm. wide. Fore femora 0·10 mm. long, 0·035 mm. wide ; fore tibiæ (incl. tarsi) 0·14 mm. long,

0·03 mm. wide. Pterothorax 0·17 mm. long, 0·16 mm. wide. Middle femora 0·09 mm. long, 0·03 mm. wide ; middle tibiæ (incl. tarsi) 0·12 mm. long, 0·025 mm. wide. Hind femora 0·11 mm. long, 0·025 mm. wide ; hind tibiæ (incl. tarsi) 0·18 mm. long, 0·025 mm. wide. Length of wings (without fringe) ♀ 0·65 mm., ♂ 0·40 mm. Abdomen ♀ 0·50 mm. long, 0·18 mm. wide ; ♂ 0·40 mm. long, 0·12 mm. wide. *Total length* ♀ 0·6—0·9 mm. ; ♂ 0·7 mm.

4 specimens from Coimbatore, *viz.*—In flowers and shoots of cotton, March 1920, Ramakrishna Ayyar coll. No. XV, 1 ♂, 1 ♀.—In Pomegranate flowers, Sept. 1st 1923, A. G. Ramaswamiah coll. No. 4, (T. V. R. No. 47.) 1 ♀.—From *Cæsalpinia pulcherrima* flowers Sept. 23rd 1923, A. G. Ramaswamiah coll. No. 37, 1 ♀.

This new species belongs to the *loennbergi*-group on account of the presence of posterolateral bristles. It seems to come nearest to the African *loennbergi*, but differs in having 2 bristles only on lower vein, whilst there are 4—5 in *loennbergi*, and by the antennal joints 3 to 6 being shorter ; moreover, in *loennbergi* joint 6 is shorter than 3, in *oligochaetus* it is longer. Further, there is *nubicus*, which agrees closely with *oligochaetus*, differing, however, in having 12 bristles on lower vein. The chætotaxy of fore wings in *oligochaetus* agrees very well with the Sumatran *andreae*, but the latter differs, amongst other characters, at once, by the dark fore-wings. The same is the case with *sumatrensis* and *theivorus*, in which the chætotaxy is also different. The tea-inhabiting species (*theiperdus*, *theivorus*, *theifolii*) have much longer sense-cones on antennal joints 3 and 4, and a different chætotaxy of the forewings. *A. theiperdus*, moreover, does not belong to the *loennbergi*-group as it has no posterolateral bristles.

Anaphothrips ramakrishnai, n. spec.

(Plate XVIII, fig. 6).

♀, ♂.—General colour as in the preceding species, but abdomen without darker transverse lines. 1st antennal joint whitish hyaline, 2nd slightly darker greyish yellow ; joint 3 to 5 pale greyish, 3 very slightly smoky before apex, 4 and 5 distinctly infuscated in apical third ; basal half of 6th pale greyish, apical half and style darker greyish.

Head wider than long, sides parallel ; fore margin nearly straight. Eyes not protruding, hardly as long as the cheeks. Antennæ (Fig. 9), especially joint 2, somewhat more slender than in *oligochaetus*. Sense-cones of joint 3 and 4 short. Mouth cone pointed, otherwise as in the preceding species. Maxillary palpi smaller ; relative length and width of the joints the same as in *oligochaetus*. Labial palpi as long and wide as the apical joint of maxillary palpi.

Fig. 9. *Anaphothrips ramakrishnai*, n. sp., ♀, antenna.

Prothorax as in the preceding species, but with two strong bristles near each posterior angle ; these are about three times as long as the other bristles on the thorax and nearly one third of the whole prothoracic length. On the hind margin, near the middle there is another pair of bristles, nearly as strong as the posterolaterals and fully one and a half times as long as the short surface-bristles. Pterothorax practically as in *oligochaetus*. Bristles of legs arranged as in the latter, but they are hyaline, not dark, and therefore much less conspicuous.

Wings reaching the 7th or 8th segment in ♀, the 9th in ♂. Bristle length as in the preceding species, number : costa 22—28, upper vein (4—5+4)+2 ; lower vein 12—15 in a continuous row ; scale 4—5 on fore margin, 1 on surface near base, 1 at apex.

Abdomen practically as in *oligochaetus*, bristles of 9th and 10th segments even longer in both sexes. Apical segment of ♀ somewhat more conical.

Measurements ; ♀, ♂. Total length of antenna 0·23 mm. ; I. joint 0·02 mm. long, 0·023 mm. wide ; II. joint 0·032 mm. long, 0·022 mm. wide ; III. joint 0·042 mm. long, 0·013 mm. wide ; IV. joint 0·041 mm. long, 0·013 mm. wide ; V. joint 0·032 mm. long, 0·014 mm. wide ; VI. joint 0·045 mm. long, 0·014 mm. wide ; VII. joint 0·005 mm. long, 0·007 mm. wide ; VIII. joint 0·008 mm. long, 0·005 mm. wide. Head 0·10 mm. long, 0·13 mm. wide. Prothorax 0·12 mm. long, 0·16 mm. wide. Fore femora 0·10 mm. long, 0·045 mm. wide ; fore tibiæ (incl. tarsi) 0·14 mm. long. 0·032 mm. wide. Pterothorax ♀ 0·25 long, 0·23 mm. wide ; ♂0 20 mm. long, 0·18 mm. wide. Middle femora 0·09 mm. long, 0·03 mm. wide ; middle tibiæ (incl. tarsi) 0·14 mm. long, 0·03 mm. wide. Hind femora 0·11 mm. long, 0·035 mm. wide ; hind tibiæ (incl. tarsi) 0·20 mm. long, 0·03 mm. wide. Length of wings (without fringe)♀ 0·60 mm., ♂ 0·50 mm. Abdomen ♀ 0·70 mm. long, 0·23 mm. wide ; ♂ 0,50 mm. long, 0·15 mm. wide. ***Total length*** ♀ 1·0—1·3 mm. ; ♂ 0·810 mm.

Several specimens of both sexes from Coimbatore, in ears of ' Cumbu ' (*Pennisetum typhoideum*), 13th Septr. 1918, Ramakrishna Ayyar coll. No. XIV.

I have pleasure in naming this species in honour of its discoverer.

Near *oligochaetus*, differing especially by more slender and differently coloured antennæ, shorter sense-cones, and in chætotaxy of forewings. From *oligochætus* and all the other species of the *loennbergi*-group, it differs, moreover, by the greater number of bristles on lower vein, a character in which it agrees only with *nubicus*. From this, *ramakrishnai* differs, however, by a longer 5th antennal joint, longer posterolateral bristles of prothorax, and longer wings.

Perissothrips parviceps, Hood.

(Plate XIX, fig. 1).

Coimbatore, on *Ailanthus excelsa*, Ramakrishna Ayyar coll. (many ♀♀, no ♂).— 1 ♀ from Coimbatore in shoots of a wild legume, August 1923 ; Ramakrishna Ayyar

coll. No. 32.—1 ♀ from Coimbatore, in *Caesalpinia pulcherrima* flowers, Sept. 23rd 1923, A. G. Ramaswamiah coll. No. 37.

Bregmatothrips binervis, Kobus.

(Plate XIX, figs. 2, 3).

A few specimens from Palur, S. Arcot, rolling leaf tips of sugar cane, Oct. 29th 1918, Ramakrishna Ayyar coll. No. XXIII.

From Bagnall's description of *B. ramakrishnae* I cannot find any difference between it and the Javanese species. Bagnall has not mentioned the latter, and compares his species in his description with *venustus* and *gracilis*, both American, but not with the Javanese species, living on sugar-cane quite as *ramakrishnae*. Thus, Bagnall may probably have overlooked *binervis*, and I believe therefore that *ramakrishnae* will be a synonym of Kobus's species.

STYLOTHRIPS, N. GEN.

Body without polygonal net-sculpture, of usual shape. Head not produced forwards in front of eyes. Ocelli widely separated, arranged in an acutangular triangle. Occiput with some transverse striæ. Antennae 7-segmented, short and thick, especially the 5th joint extraordinarily short. 3rd and 4th joint with short forked sense-cones. Style one-segmented, cylindrical, bluntly pointed at apex about half as long as the 6th antennal joint. Mouth cone triangularly rounded, not reaching beyond prosternum. Maxillary palpi 3-segmented, joints unusually short: 1st joint wider than long, 2nd slightly longer than wide at base, 3rd cylindrical. Pronotum without long, stout bristles; hind margin with about 20 very short, weak bristle hairs, of which two near either angle and one pair in the middle are longer than the rest. Tibiæ and tarsi unarmed. Wings fully developed in ♀♀, whilst in ♂♂ they are either fully developed or reduced to small pads; forewings with two longitudinal veins, set with some short, very weak bristles. Ovipositor well developed. Penis short and thick. End of abdomen with long, weak bristlehairs, without spines; bluntly rounded in ♂, conically pointed in ♀, never tubiform.

This new genus, in general appearance, structure of wings and by the shape of penis, somewhat resembles the genera *Limothrips* and *Chirothrips*; to the latter by the chætotaxy of pronotum as well. The ocelli are even more widely separated than in those two genera, whilst the shape of head is quite different, and the 7-segmented antennæ offer also an important differential character. Further, *Limothrips* and *Chirothrips* have usually simple sense-cones on antennal segments 3 and 4 (Hinds), although I believe this character is not of generic value, as *L. angulicornis* has forked sense-cones, as may be seen from Jones' figure of an American specimen ("*setariae*")

and from slides of European specimens in my collection. My new genus, on the other hand, has always forked sense-cones.

Thus, *Stylothrips* should come into the vicinity of *Anaphothrips* and *Bregmatothrips*, distinguished from both, however, at once by the one-jointed style and chætotaxy of pronotum. There is only one genus hitherto known with 7-segmented antennæ which does not possess any long, strong posterolateral bristles, *viz.*, *Fulmekiola*. This is, however, also quite different from *Stylothrips*, as the posterolateral bristles of the former, though weak, are much longer than in the latter genus, the short bristle-hairs are much less numerous, whilst the shape of head is produced forward in *Fulmekiola* as in *Chirothrips* and *Limothrips*, thus resembling *Plesiothrips* much more than any other genus. Further, there are no large interocellar bristles in *Stylothrips* as in *Fulmekiola*; the maxillary palpi are of usual shape in *Fulmekiola*, whilst the short, wide basal joint of *Stylothrips* seems to be a very unusual and valuable character.

Stylothrips brevipalpis, n. spec.

(Plate XIX, fig. 4.)

♀. Yellowish brown to dark brown. Tarsi and distal part of tibiæ more or less paler. Antennæ brown, 1st and 2nd joint as dark as the body, 2nd somewhat paler distad; 3rd still paler, 4th darker than 3rd, 5th and 6th still darker, as dark as the body, style somewhat paler, as dark as 4th. Forewings infumated with brownish grey on whole surface, being darker along margins and veins; hind wings slightly infumate along median vein. Bristles of fore wings very weak, hair-like, about half as long as the width of wing in the middle; those along fore margin somewhat

Fig. 10. *Stylothrips brevipalpis*, n. gen., n. sp. *a* dorsal view of head; *b* mouth cone; *c* hind part prothorax, chætotaxy; *d* fore wing of a brachypterous ♂.

longer, in distal part still longer and thinner, so that they are hardly distinguishable from the fringe-hairs.—Chætotaxy : costa 20—25 ; upper vein (4—5+3—4)+3—4 ; lower vein with 7 bristles, regularly disposed, the distances becoming gradually greater distad, the row beginning behind the last ante-medial bristle of chief vein, and ending between the penultimate and last distal bristle of that vein ; scale 4 along fore margin, 1 on surface near base, 1 at apex (and the two hyaline, sense cone-like structures). Tergites 1 to 8 of abdomen with transverse striæ and the hind margin serrate with numerous, small, triangular lobes across the whole width of body.

Measurements, ♀. Total length of antenna 0·17 mm. ; I. joint 0·01 mm. long, 0·02 mm. wide ; II. joint 0·025 mm. long, 0·021 mm. wide ; III. joint 0·03 mm. long, 0·017 mm. wide ; IV. joint 0·026 mm. long, 0·017 mm. wide ; V. joint 0·021 mm. long, 0·014 mm. wide ; VI. joint 0·038 mm. long, 0·017 mm. wide ; VII. joint 0·017 mm. long, 0·005 mm. wide. Head 0·08 mm. long, 0·12 mm. wide. Prothorax 0·13 mm. long, 0·18 mm. wide. Fore femora 0·10 mm. long, 0·05 mm. wide ; fore tibiæ (incl. tarsi) 0·13 mm. long, 0·04 mm. wide. Pterothorax 0·22 mm. long, 0·22 mm. wide. Middle femora 0·08 mm. long, 0·03 mm. wide ; middle tibiæ (incl. tars) 0·10 mm. long, 0·03 mm. wide. Hind femora 0·10 mm. long, 0·04 mm. wide ; hind tibiæ (incl. tarsi) 0·15 mm. long, 0,03 mm. wide. Length of wings (without fringe) 0·53 mm. Abdomen 0·7 mm. long, 0·24 mm. wide. *Total length* 0·8-1·1 mm.

♂ (macropterous). Smaller and paler than ♀, brownish yellow, head darker brown. 1st and 2nd antennal joints not darker than third, the following joints coloured as in ♀. Chætotaxy of wings and structure of abdomen as in ♀.

♂ (brachypterous).—Even paler than the macropterous ♂, pale lemon yellow, head brownish yellow. 1st and 2nd antennal joints pale lemon yellow, the others as in♀. Ocelli arranged as in the macropterous specimens, but somewhat smaller. Pterothorax somewhat shorter and narrower than in the macropterous ♂♂. Wings reduced to small, bristled pads (Fig. 10 d), not quite reaching the hind margin of metathorax. Abdominal structures indistinct because of the very pale, almost transparent colour.

Measurements, ♂ : Total length of antenna 0·14 mm ; I. joint 0·01 mm. long, 0·02 mm. wide ; II. joint 0·023 mm. long, 0.018 mm. wide ; III. joint 0·026 mm. long, 0.014 mm. wide ; IV. joint 0·022 mm. long, 0·014 mm. wide ; V. joint 0·017 mm. long, 0·012 mm. wide ; VI. joint 0·031 mm. long, 0·014 mm. wide; VII. joint 0·012 mm. long, 0·005 mm. wide. Head 0·07mm. long, 0·09 mm. wide. Prothorax 0·10 mm. long, 0·14 mm. wide. Fore femora 0·08 mm. long, 0·04 mm. wide ; fore tibiae (incl. tarsi) 0·11 mm. long, 0·035 mm. wide. Pterothorax 0·16 (macropt.) or 0·14 (brach.) mm. long, 0·17 (macropt.) or 0·15 (brach.) mm. wide. Middle femora 0·06 mm. long, 0·03 mm. wide ; middle tibiae (incl. tarsi) 0·08 mm. long, 0·03 mm. wide. Hind femora 0·08 mm. long, 0·035 mm. wide ; hind tibiae (incl. tarsi) 0·12 mm. long, 0·03 mm. wide. Length of fore wings 0·12

mm. in macropterous, 0·10 mm. in brachypterous ♂♂. Abdomen 0·33 mm. long, 0·17 mm. wide.—*Total length*—0·6—0·8 mm.

Described from several ♀♀, 1 macropterous ♂ and 4 brachypterous ♂♂ from Coimbatore ; inside *Chrysanthemum* flowers, 13th August 1918, Ramakrishna Ayyar coll. No. XX.

RAMASWAMIAHIELLA, N. GEN.

Body without polygonal net-sculpture, of usual shape. Head not produced forward in front of eyes. Cheeks not spined nor roughly sculptured. Ocelli closely approximate to one another, arranged in an obtusangular triangle. Antennae 7-segmented, of usual shape ; 5th joint fusiform, not unusually short. 3rd and 4th joint with short, forked sense-cones. Style 1-segmented, conical, about one fourth the length of 6th joint. Mouth cone triangular, not or hardly reaching the hind margin of prosternum ; maxillary palpi 3-segmented, joints of usual shape and length. Pronotum without long, stout bristles, clothed on whole surface with some short bristle-hairs ; hind angles with 2 somewhat stouter bristles which are hardly one fifth as long as the pronotum, between them one short bristlehair ; mesad from them, 3 short bristles and one longer pair in the middle of hind margin (Fig. 11c). Tibiae and tarsi unarmed. Wings fully developed in both sexes ; fore wings with two longitudinal veins, set with some short bristles. Ovipositor well developed. End of abdomen with some long bristles, without spines ; bluntly conical, not tubiform.

Named in honour of its first discoverer, Mr. A. G. Ramiaswamiah.

This new genus should come near *Anaphothrips*, but differs from it by the 7-segmented antennae, so that it somewhat resembles *Fulmekiola* and *Stylothrips*. From the former, it differs, however, by the shape of head, by the shorter style, by the absence of large anteocellar bristles and by the much shorter posterolateral bristles of prothorax. From *Stylothrips*, it differs by the wider head, the different arrangement of ocelli, the shape of antennae, especially joint 5 and style, by the chaetotaxy of pronotum and the longer joints of maxillary palpi.

It is not improbable that my *Thrips microchaetus* might perhaps be placed under the new genus, although in that African species the posterolateral bristles of prothorax are considerably stouter and longer than in the Indian *Ramaswamiahiella*. Because of this character, I would at present prefer to place *microchaetus* as before in the true genus *Thrips*.

Ramaswamiahiella subnudula, n. spec. (Plate XIX, fig. 5, 6).

♀, ♂. Pale yellow to orange yellow, legs paler. General colour of antennae paler than the head, yellowish white ; 2nd and 3rd joints very slightly infumated along both margins, 4th and 5th joint greyish infumated in distal half or thereabouts,

6th in distal two-thirds; style grey. Ocelli with large red pigment-cups. Eyes black, nearly as long as the cheeks behind them. Pterothorax with sides of each segment arched, mesothorax wider and with more strongly rounded sides than metathorax. Wings almost reaching the 8th abdominal segment in ♀, the end of abdomen or nearly so in ♂, slightly greyish yellow infumation on whole surface. Bristles of forewings half as long as the width of wing near the middle, stouter than in *Stylothrips*; those along costa not longer than the others, even in distal part very well distinguishable from the fringe-hairs, being much thicker and shorter than those. Chætotaxy: costa 25-30; chief vein 7 (4+3 or 3+4)+3; lower vein 10-14 in a continuous row, beginning before the last ante-medial bristle of upper vein and ending between the penultimate and last distal bristle of that vein; scale 4 along fore margin, 1 on surface near base, 1 at apex. Abdominal bristles rather weak and short, hardly one-third as long as the segments themselves, on 7 and 8 in ♀, on 5 to 8 in ♂ half as long, on 9 and 10 about as long as the apical segment; bristles of last segment in ♀ somewhat shorter than those on the penultimate, in ♂ nearly twice as long. Ovipositor extending basad to the middle of 7th segment. Penis short and stout.

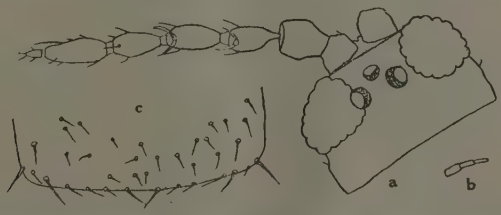


FIG. 11. *Ramaswamiahiella subnudula*, n. gen., n. sp. *a* dorsal view of head; *b* maxillary palpus; *c* hind part of prothorax, chaetotaxy.

Measurements: Total length of antenna 0·18 mm; I. joint 0·015 mm. long, 0·02 mm. wide; II. joint 0·025 mm. long, 0·019 mm. wide; III. joint 0·03 mm. long, 0·013 mm. wide; IV. joint 0·03 mm. long, 0·014 mm. wide; V. joint 0·03 mm. long, 0·013 mm. wide; VI. joint 0·038 mm. long, 0·013 mm. wide; VII. joint 0·01 mm. long 0·005 mm. wide. Head 0·075 mm. long, 0·10 mm. wide. Prothorax 0·09 mm. long, 0·13 mm. wide. Fore femora 0·085 mm. long, 0·04 mm. wide; fore tibiæ (incl. tarsi) 0·12 mm. long, 0·03 mm. wide. Pterothorax 0·165 mm. long, 0·165 mm. wide. Middle femora 0·07 mm. long, 0·025 mm. wide; middle tibiæ (incl. tarsi) 0·10 mm. long, 0·02 mm. wide. Hind femora 0·10 mm. long, 0·035 mm. wide; hind tibiæ (incl. tarsi), 0·15 mm. long, 0·03 mm. wide. Length of wings (without fringe) 0·41 mm. Abdomen ♀ 0·48 mm. long, 0·19 mm. wide; ♂ 0·28 mm. long, 0·13 mm. wide.—*Total length*—♀ 0·75—0,95 mm; ♂ 0·5—0·7 mm.

Described from numerous ♀♀ and ♂♂ from Coimbatore, *viz*:—Numerous specimens in *Calotropis* flowers, Feb. 15th, 1924, Ramakrishna Ayyar coll. No. 39.—A few specimens from the following numbers: No. 3, (T. V. R. No. 46.) *Illecebrum lanatum* flowers, Sept. 11th, 1923, A. G. Ramaswamiah coll.; No. 37, *Cæsalpinia*

pulcherrim flowers, Sept. 23rd, 1923, A. G. Ramashamiah coll.; No. 38, on Mango flowers, Feb. 15th, 1924, Ramakrishna Ayyar coll.—1♀ from Pomegranate flowers, Sept. 1st, 1923, A. G. Ramaswamiah coll. No. 4. (T. V. R. No. 47.) 2 ♀♀ from *Hibiscus rosa-sinensis* flowers, Sept. 19:3, Ramakrishna Ayyar coll. No. 26.

TUBULIFERA.

Arrhenothrips ramakrishnæ, Hood (Plate XX, fig. 1).

I cannot agree with Bagnall (*Ann. Mag. Nat. Hist.* (9) XIV, p. 635, 1924) in identifying *Arrhenothrips* with *Mesothrips*, because of the sharply pointed mouth-cone in the former (Fig. 12*a*), whilst it is rounded at apex in the latter genus. Further, in *Mesothrips* the wings are more or less constricted in the middle (though sometimes very feebly), in *Arrhenothrips* they are quite parallel-sided throughout.

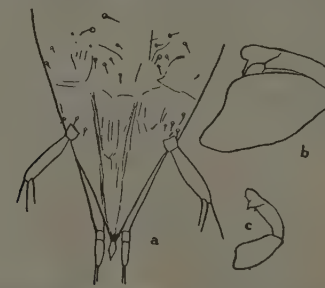


Fig. 12. *Arrhenothrips ramakrishnae* Hood, *a* mouth cone; *b* fore leg of a megalomerous, *c* of a micromerous specimen; *b* and *c* under the same magnification.

As Hood (*Ins. Insc. Menstr.* VII, p. 98, 1919) has already pointed out, it is usually the female which has the larger fore femora. In the ♂, they are more variable in size, from small "micromerous" types to typically "macromerous" ones (fig. 12 *b*, *c*), in quite the same manner as it occurs also in the Australian *Euoplothrips bagnalli*, Hood (Karny, *Proc. Linn. Soc. N. S. W.*, xlix, 3, fig. 3, 1924).

The specimens before me were all taken at Coimbatore from *Mimusops elengi*, partly by Ramakrishna Ayyar, paratypes from material sent to Hood in 1916; and a later lot by A. G. Ramaswamiah, No. 8, Aug. 3rd, 1923. (T. V. R. No. 50.)

Eurhynchothrips ordinarius, (Hood) (Plate XX, fig. 6).

Very closely related to the African type species of the genus, *convergens* Bagnall; if they are really two different species, *ordinarius* may be distinguished by the slightly longer head, different relative lengths of antennal joints, and in the number of duplicated ciliæ, (25 in this *sp.* and 11 to 18 in *convergens*). The accessory bristle near pronotal hind angle, as mentioned in Bagnall's description of the genus, is present,

though it is rather small, in *ordinarius* also (Fig. 13) and was apparently overlooked by Hood.

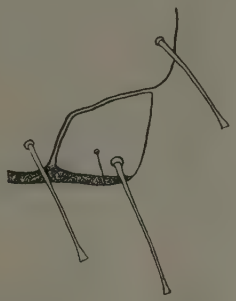


Fig. 13. *Eurhynchothrips ordinarius* (Hood); hind part of prothorax, chætotaxy.

Coimbatore, inside flowers of agathi (*Sesbania grandiflora*), Ramakrishna Ayyar coll. No. XIII (Cotypes from material sent to Hood in 1916).

Rhynchothrips pallipes, n. spec. (Plate XX, fig. 4).

♀. General colour dark brown; extreme tips of all femora and the whole of all tibiæ and tarsi pale yellowish. 1st antennal joint brownish, paler than the body; 2 to 5 bright yellow; 6 yellowish in basal half, dark brownish grey distad; 7 and 8 dark brownish grey throughout. Wings hyaline, with a wide, clouded, smoky cross band in the middle.

Head somewhat longer than wide across eyes, sides smooth, very slightly arched, converging backwards. Eyes black, small, occupying not quite one-third of the length of head, not at all protruding. Ocelli arranged in a rectangular triangle, the anterior one directed forwards, the posterior ones situated in front of a line drawn through middle of eyes. Postocular bristles short, about half as long as the eyes, knobbed at apex.

Antennæ (Fig. 14*a*) of usual shape, seven fourths the length of head. 3rd joint clavate, 4th broadly clavate; 5 to 7 ovate, constricted basad to a short pedicle

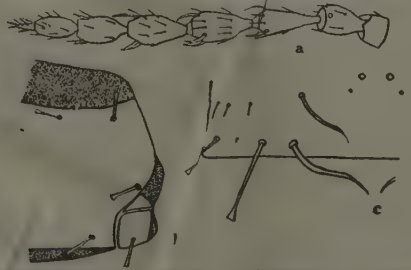


Fig. 14. *Rhynchothrips pallipes*, n. sp. *a* antenna; *b* chætotaxy of prothorax; *c* chætotaxy of abdominal segment.

8 conical, broadly united with 7. Bristles short. Sense-area of 2nd joint close before apex. Sense-cones short, curved, arranged as in *Eurhynchothrips*.

Mouth cone long, sharply pointed, reaching base of prosternum. All prothoracic bristles present (Fig. 14*b*), short and stout, dilated at apex. That on fore coxa of the same length and shape as the posterolaterals. Fore femora rather small, slightly incrassate. Fore tarsi unarmed.

Pterothorax very slightly wider than prothorax, sides slightly arched, somewhat converging backwards. Middle and hind legs short and rather stout.

Wings reaching the base of 5th abdominal segment (abdomen of the unique specimen before me being too expanded longitudinally). Forewing gradually narrowing from base to middle, where it is about two-thirds as wide as near base; not widened again distad, therefore not belonging to the *Haplothrips-Neoheegeria* type. 3 subbasal bristles, about equally distant, similar in length and shape to the posterolaterals of pronotum. Hind margin distad with 9 accessory fringe-hairs.

Abdominal segments (Fig. 14*c*) 1 to 9 with two distad dilated bristles, near each posterior angle, only on 1st segment is the outer one absent. The inner one on each segment is about as long as the tergite itself; laterad from the outer there is a short, pointed bristle-hair. The outer dilated bristle on segments 2 to 4 about half as long as the inner, or a little more, on 5 and 6 two-thirds as long, on 7 to 9 as long as or slightly longer than the inner one. Besides these, the 9th segment is furnished on either side with one sharply pointed, very long bristle, nearly as long as the tube and with a few shorter bristle-hairs, not quite half as long as the 9th segment. Terminal bristles of tube stout basad, hair-like and somewhat curved distad, as long as the tube, alternating with short bristle-hairs, which are about one-third as long as the longer ones. Wing-retaining spines well developed; the hindermost pair on 2nd segment not quite as long as the distance between their tips, on 3 to 5 nearly touching each other at the tips (Fig. 14 c), on 4 and 5 much thicker, but slightly shorter than on 3; on 6 as long as the distance between tips; on 7 very weak, almost hair-like, hardly one-third of the distance between apices. The anterior one everywhere about two-thirds the length of the posterior and also distinctly thinner. Tube short and stout, about two-thirds the length of head, sides parallel at extreme base, beyond that straight and converging.

Measurements, ♀: Total length of antenna 0·35 mm.; I. joint 0·025 mm. long, 0·03 mm. wide; II. joint 0·04 mm. long, 0·028 mm. wide; III. joint 0·06 mm. long, 0·025 mm. wide; IV. joint 0·06 mm. long, 0·03 mm. wide; V. joint 0·057 mm. long, 0·028 mm. wide; VI. joint 0·05 mm. long, 0·025 mm. wide; VII joint 0·04 mm. long, 0·02 mm. wide; VIII. joint 0·02 mm. long, 0·01 mm. wide. Head 0·20 mm. long, 0·16 mm. wide. Prothorax 0·16 mm. long, 0·31 mm. wide (across fore coxæ). Fore femora 0·20 mm. long, 0·08 mm. wide; fore tibiæ (incl. tarsi) 0·16 mm. long, 0·04 mm. wide. Pterothorax 0·30 mm. long, 0·33 mm. wide. Middle femora 0·13 mm. long, 0·05 mm. wide; middle tibiæ (incl. tarsi) 0·16 mm. long, 0·04 mm. wide. Hind femora 0·18 mm. long, 0·06 mm. wide; hind tibiæ (incl. tarsi) 0·23 mm. long,

0·04 mm. wide. Length of wings (without fringe) 0·7 mm. Abdomen (incl. tube) 1·3 mm. long (too extended), 0·34 mm. wide. Length of tube 0·13 mm., width at base 0·07 mm., at apex 0·033 mm.—*Total length* 2·0 mm.

Described from 1 ♀ taken in Travancore "inside psyllid galls on *Terminalia* leaves" Oct. 1923; Ramakrishna Ayyar coll. No. 33.

This species comes in Priesner's key (*Ent. Zeitschr. Frankf.*, XXXVII, 21.2) near *æthiops* and *ruber*, differing from both at first view by the pale tibiæ of all legs, by colouration of antennæ, and the smoky cross-band of fore wings. It is also quite different from the few species not included in Priesner's table. By the yellow tibiæ, *Rhynchothrips pallipes* reminds one of *Necheegeria citripes*, also from India, differing, however, in the colour of the antennal joints and the fore wings.

Dolichothrips ochripes, n. spec. (Plate XX, fig. 2).

Body very dark castaneous brown, all legs uniformly brownish ochreous, distinctly paler than the body. Antennal joints 1 and 2 paler than body, but darker than legs; 3 to 7 uniformly dark brownish yellow, 7 slightly infumated distad; 8 grey brown. Wings clear.

Head not quite twice as long as wide, sides subparallel. Eyes occupying about two-fifths the length of head. Ocelli approximated to one another, situated near the fore margin. Postocular bristles short, thick, dark brown, inserted somewhat before the middle of head, gradually and slightly dilated distad, about half as long as the eye, laterad not extending beyond the sides of head, visible, therefore, in lateral view only. (Antennæ see Fig. 15*a*.) Mouth cone sharply pointed, much tapering in distal part, with excavate sides, almost reaching the hind margin of prosternum. Maxillary palpi not reaching the tip of mouth cone; basal joint about one and a half times as long as wide, apical joint about seven times as long as wide.

Prothorax long, not very much widened backwards. All bristles present, thick, dark brown, somewhat dilated distad. Posterolaterals about two-fifths the length of prothorax; anterolaterals about half as long or slightly more than the posterolaterals; anteromarginals slightly longer than the anterolaterals. Posteromarginals and mediolaterals about intermediate in length between the posterolaterals and anterolaterals. Anteromarginals about one and a half times as far distant from one another as from the anterolaterals. Mediolaterals inserted in the middle between anterolaterals and posterolaterals. Posteromarginals about three times as far distant from one another as from the posterolaterals. Fore coxal seta about half as long as the posterolateral, otherwise quite similar. Fore legs moderately long, femora not enlarged, tarsi with a very small, inconspicuous tooth.

Pterothorax somewhat longer than wide, sides of either segment slightly arched and converging backwards. Middle and hind legs slender. Wings reaching almost to the sixth abdominal segment, somewhat constricted in the middle. 3 subbasal bristles, about equidistant from another, somewhat shorter than the posterolaterals,

the second slightly longer than 1st and 3rd, all thick, slightly dilated distad, 1st and 2nd dark brown, 3rd paler, yellowish. 6 to 7 interlocated ciliæ very near to the tip of forewing.

Abdomen narrow, gradually tapering to tube. Bristles shaped and coloured as those of prothorax. Segment 1 with one bristle on either side, about as long as the segment. Segments 2 to 8 with two such bristles on either side, on segment 2 the inner somewhat more than half as long as the segment, the outer about half as long as the inner. Both bristles, the outer more than the inner, increasing in length from segment to segment, but on 8 still shorter than the segment itself ; on 7 both of about equal length, on 8 the outer longer than the inner. 9th segment with 3 bristles on either side, which are about as long as the tube, stout, dark, pointed at apex. Tube short and thick ; terminal bristles weak, pointed, not quite half as long as the tube. Wing-retaining spines very well developed on segments 2 to 6, much less on 7 ; both pairs on all these segments dark and unusually thick. The posterior ones on segment 2 not quite half as long as the distance between their tips, on 3 not quite as long as this distance, on 4 and 5 longer, on 6 half as long, on 7 hardly one-fourth of the distance between tips. Anterior pair everywhere slightly thinner and somewhat shorter than the posterior one, except on segment 7, where both are of about equal length and width. Close before the anterior one, there is an accessory wing-retaining spine on all these segments, somewhat thinner and shorter than the other ; and laterad from them, two short, thick, dark, pointed bristles are inserted (fig. 15*b*.)

FIG. 15. *Dolichothrips ochripes*, n sp. *a* antenna ; *b* chaetotaxy of sixth abdominal segment.

Measurements : Total length of antenna 0·37 mm.; I. joint 0·025 mm. long, 0·03 mm. wide ; II. joint 0·04 mm. long, 0·027 mm. wide ; III. joint 0·065 mm. long, 0·022 mm. wide ; IV. joint 0·065 mm. long, 0·023 mm. wide ; V. joint 0·06 mm. long, 0·02 mm. wide ; VI. joint 0·053 mm. long, 0·02 mm. wide ; VII. joint 0·04 mm. long, 0·016 mm. wide ; VIII. joint 0·02 mm. long, 0·01 mm. wide. Head 0·25 mm. long, 0·14 mm. wide. Prothorax 0·16 mm. long, 0·25 mm. wide (across fore coxæ).

Fore femora 0·19 mm. long, 0·06 mm. wide; fore tibiæ (incl. tarsi) 0·25 mm. long, 0·035 mm. wide. Pterothorax 0·30 mm. long, 0·27 mm. wide. Middle femora 0·16 mm. long, 0·05 mm. wide; middle tibiæ (incl. tarsi) 0·24 mm. long, 0·035 mm. wide. Hind femora 0·23 mm. long, 0·05 mm. wide; hind tibiæ (incl. tarsi) 0·30 mm. long, 0·035 mm. wide. Length of wings (without fringe) 0·6 mm. Abdomen (incl. tube) 1·10 mm. long, 0·22 mm. wide. Length of tube 0·13 mm., width at base 0·07, mm., at apex 0·035 mm.—*Total length* 1·6—2·2 mm.

Described from 7 specimens, taken at Coimbatore, in shoots of *Cassia tora*, 4th Aug. 1923; by Ramakrishna Ayyar, No. 28.

Differing from all the hitherto known species of *Dolichothrips* and also from all species of *Neoheegeria* at first view by the uniformly ochreous femora and tibiæ of all legs. Further, the presence of an accessory wing-retaining spine seems to be very remarkable.

Neoheegeria indica, Hood (Plate XX, fig. 5).

When comparing the descriptions of *Neoheegeria indica*, Hood and *Dolichothrips varipes*, Bagnall, one finds the following differences:—length of body of *indica* 1·3 mm.—1·4 mm., of *varipes* 1·8 mm.—2·0 mm; fore tibiæ in apical three-fourths yellow in *indica*, wholly yellow in *varipes*; fore tarsi with a short stout tooth in *indica*, unarmed in *varipes*; head "about 1·2 times as long as wide" in *indica*, "only about 1·6 times as long as broad" in *varipes*.—These characters may perhaps appear to be sufficient for a specific separation; nevertheless, I am convinced after examination of the large material before me that *varipes* is a synonym of *indica*. In this material, there are several specimens without indication of food plant, sent to me by Mr. Ramakrishna Ayyar under the name "*Dolichothrips varipes*, BG.", thus apparently cotypes of Bagnall's species. On the other hand, there are also many specimens from *Ailanthus*, the food plant of *Neoheegeria indica*, Hood. Thus, I have without doubt both "species" before me, but I cannot find any constant difference. As to the length of body, they vary quite in the same manner as *Neoheegeria verbasci*, (Osborn) which is (according to Hinds, p. 189) 1·42 to 2·12 mm. long. The head is always longer than broad, but varying somewhat in relative dimensions, and the proportions given by Hood and by Bagnall respectively seem to be the extreme points of variability, whilst in the material before me the commonest proportion is about 1·3 to 1·4, according to Hood 1·2, according to Bagnall 1·6; these are also represented in the present material but less commonly than the intermediate proportions. The extension of yellow colour on fore tibiæ is also somewhat variable, as described by Hood and by Bagnall respectively. Fore tarsi usually armed with a very small tooth (as figured by Hood), which is sometimes larger, especially in the ♂, sometimes apparently wanting throughout, as described by Bagnall. I must affirm here, therefore, the synonymy indicated above.

In the material before me, there are some anomalous antennæ (fig. 16) of different shape, two of them in one specimen, whilst the others belong to individuals having the other antenna quite normally developed.

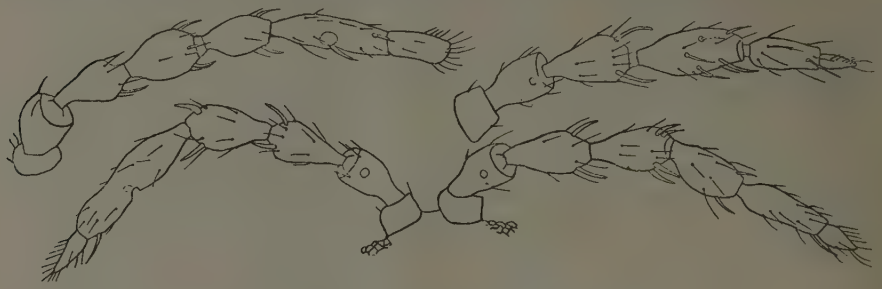


FIG. 16. Anomalous antennae of *Neoheegeria indica* Hood.

Number of duplicated fringe-hairs varying up to about 12.

The specimens before me were all collected by Mr. Ramakrishna Ayyar in the Coimbatore district, *viz.* :—"*Dolichothrips varipes*, BG.," without coll. number and without indication of food plant.—"On *Ailanthus*" without coll. number which are co-types of Hood's *indica*.—In shoots of 'Persian nim,' Sept. 1923, No. 29.—In shoots of *Cassia emarginata*, Sept. 1923, No. 20.

HAPLOTHRIPS SOROR, SCHMUTZ (Plate XX, fig. 3).

Characterized by the shape of antennal joints (Priesner, Treubia, II, 1, p. 6, key and fig. 3, 1921). Body sepia brown, with very rich red pigment. Legs as dark as the body, but without pigment; fore tibiæ and all tarsi yellowish. 1st and 2nd antennal joints as dark as head, following ones yellow, becoming darker from joint to joint, 6th only a little paler than 7 and 8 which are again uniformly sepia brown; every single joint uniformly coloured, not conspicuously paler basad than distad.

1 ♀ from Coimbatore, inside *Chrysanthemum* flowers, 13th Aug. 1918, Ramakrishna Ayyar, coll. No. XX.—2 ♀♀ from Coimbatore, on flowers of *Lantana*, Aug. 3rd, 1923, Y. Ramachandra Rao, coll. No. 1. (T. V. R. No. 44.)

HAPLOTHRIPS INQUILINUS, Priesner.

Resembling in general appearance the genus *Androthrips*, especially *A. ramachandra*, but differing in the structure of fore legs.

Antennal colouration of the specimen now before me: joints 1, 2, 6 to 8 dark throughout; 3 to 5 yellow basad, grey brown infumate distad, 3 paler than 4, and 4 paler than 5 : 3 yellow in basal three-fifths, 4 in basal two-fifths and 5 in basal third.

1 ♀ from Coimbatore, on *Mimusops elengi*, together with *Arrhenothrips ramakrishnæ*, coll. Ramakrishna Ayyar.

HAPLOTHRIPS CEYLONICUS, Schmutz.

General colour blackish brown, with rich red pigment. Antennal joints 1 and 2 of the same colour as the body, 3 to 6 bright lemon yellow, 7 yellow, more or less infumate distad, sometimes infumate throughout, 8 grey brown.—3rd antennal joint very slightly asymmetrical.—One of the specimens before me shows an anomalous antenna (Fig. 17 ; compare with the normal antenna, in *Bull. Deli Proefstation*, No. 23, p. 45, fig. 17 ; 1925).

FIG. 17. Anomalous antenna of *Haplothrips ceylonicus* Schmutz.

All the material now before me from Coimbatore, *viz.* :—In flowers on *Lantana*; Aug. 3rd, 1923, Y. Ramachandra Rao coll. No. 1 (T. V. R. No. 44).—In flowers of Jasmine, Sept. 1923 Ramakrishna Ayyar coll. No. 27, 1 ♀.—In Mango flowers, Feb. 15th, 1924, Ramakrishna Ayyar, coll. No. 38.

HAPLOTHRIPS GANGLBAUERI, Schmutz (Plate XXI, fig. 1).

General colour pale brown, with somewhat red pigment, though less than in the preceding species (the specimens studied by Schmutz and by Priesner had no red pigment ; those now before me may represent, therefore, a new variety). Antennal joint 3 pale yellow, 8 pale brown, the others becoming darker gradually from joint to joint, but every single joint not conspicuously paler basad than distad. Third antennal joint strongly asymmetrical (cf. Priesner, Treubia, II, 1, p. 6, key and fig. 1, 1921), much more than in the preceding species. Two of the specimens before me show antennal abnormalities (Fig. 18). One of the specimens before me has no wings, but I am not sure whether it represents an apterous form, or the wings had only fallen off after death.

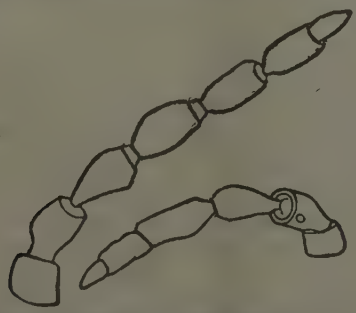


FIG. 18. Anomalous antennae of *Haplothrips ganglbaueri* Schmutz.

Some specimens of both sexes from Coimbatore, on a wild plant, March 1917 ; Ramakrishna Ayyar, coll. No. XVIII.

HAPLOTHRIPS RAMAKRISHNAI, N. SPEC. (Plate XXI, fig. 2).

♀. General colour pale chestnut brown, apparently without red pigment. Antennæ and legs uniformly grey brown, 3rd joint of antenna scarcely paler than the others ; fore tibiæ becoming gradually pale yellowish distad, basal-half of fore tarsi also pale yellowish. Middle and hind tarsi hardly paler than tibiæ. Wings clear (except the dark basal spot).

Head about as long as wide, with subparallel sides. Eyes occupying about two-fifths the length of head, not protruding. Ocelli large, arranged in an almost rectangular triangle, the anterior one situated near the fore margin, the posterior ones close before the middle of eyes. No postocular bristles visible in the unique type specimen. Antennæ (Fig. 19*a*) one and a half times as long as head, 3rd joint very slightly asymmetrical, 4 and 5 broadly rounded. Sense-cones short and thick. Mouth cone (Fig. 19*b*) very small, not quite reaching the middle of prosternum, rounded. Palpi short and thick ; basal joint of maxillary palpi wider than long, apical joint about four times as long as wide.

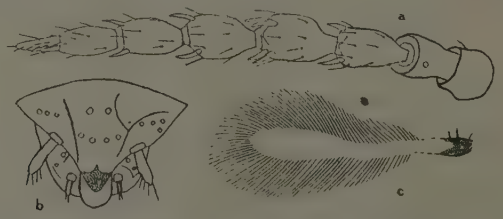


FIG. 19. *Haplothrips ramakrishnai*, n. sp. *a* antenna ; *b* mouth cone ; *c* fore wing.

Prothorax shorter than head, somewhat widened backwards. Posterolateral bristles hyaline, about two-fifths the length of prothorax, truncate at apex. Other bristles not visible with certainty, but apparently present. Fore femora somewhat dilated. Fore tarsi with a very minute tooth, visible under high magnifications only.

Pterothorax as long as wide, sides very slightly arched. Middle and hind legs moderately short and stout. Wing (Fig. 19*c*) strongly constricted near the middle and strongly dilated distad, in the middle hardly half as wide as in distal part. Fringe-hairs dark, not dense, nor duplicated in distal part of fore wings. Subbasal bristles subhyaline, truncated at apex ; the middle one somewhat longer than the others, and somewhat more approximated to the third than to the first.

Abdominal bristles hyaline, blunt at apex (even on segment 9), long on the distal segments, short and inconspicuous on the basal ones. Tube two-thirds as long as head, with straight, distally converging sides. Terminal bristles brown, hair-like

distad, shorter than the tube; the shorter ones about one-fourth the length of the others. Wing-retaining spines thick and stout, but not very long; those of hind pair on segment 2 and 7 about one-third as long as the distance between their tips, on segment 3 and 6 half as long, on 4 and 5 two-thirds of the tip-distance.

Measurements, ♀; Total length of antennæ 0.30 mm; I. joint 0·02 mm. long, 0,03 mm. wide; II. joint 0·04 mm. long, 0·027mm. wide; III. joint 0·045 mm. long, 0,028 mm. wide; IV. joint 0·048 mm. long, 0·032 mm. wide; V. joint 0·043 mm. long, 0·028 mm. wide; VI. joint 0·042 mm. long, 0·022 mm. wide; VII. joint 0·04 mm. long, 0·018 mm. wide; VIII. joint 0·027 mm. long, 0·01 mm. wide. Head 0·21 mm. long, 0·19 mm. wide. Prothorax 0·15 mm. long, 0·30 mm. wide(across fore coxæ). Fore femora 0·15 mm. long, 0·08 mm. wide; fore tibiæ (incl. tarsi) 0·18 mm. long, 0·04 mm. wide. Pterothorax 0·35 mm. long, 0·35 mm. wide. Middle femora 0·13 mm. long, 0·05 mm. wide; middle tibiæ (incl. tarsi) 0·20 mm. long, 0·04 mm. wide. Hind femora 0·19 mm. long, 0·055 mm. wide; hind tibiæ (incl. tarsi) 0·26 mm. long, 0·04 mm. wide. Length of wings (without fringe) 0·77, width near the middle 0·035 mm., before apex 0·08 mm. Abdomen (incl. tube) 1·2 mm. long, 0·39 mm. wide. Length of tube 0·14 mm., width at base 0·06 mm., at apex 0·03 mm.—*Total length* 1·9 mm.

1 ♀ from Coimbatore, inside *Chrysanthemum* flowers, 13th Aug., 1918, Ramakrishna Ayyar, coll. No. XX.

Comes between the African *bagnalli* and the Australian *robustus* and *melanoceratus*; according to relative length of antennæ, about intermediate between them. 3rd antennal joint darker than in *bagnalli* and *robustus*, dimensions of antennal joints practically as in *bagnalli* but the middle joints more rounded (compare my figure here with those given by Trybom, 1910). Wings much more broadened distad than in *bagnalli*, tube shorter, more or less as in *robustus*.

AUSTROTHRIPS COCHINCHINENSIS, Karny (Plate XXI, fig. 6).

Comp: Ramchandra Rao, *Agric. Journ. India*, Vol. XIX, pt. IV, pp. 436-437, 1924.

The Indian specimens agree perfectly with the type specimens from Indo-china, but have the 7th antennal segment always more or less greyish infumate, sometimes as dark as the 8th, while this infumation in the Indochinese specimens, though present, is much less conspicuous. One of the specimens before me shows an antennal abnormality (Fig. 20). Several specimens, both sexes, from galls on *Calycopteris floribunda*, Lamk., Taliparamba, May 20th, 1923, Rao Sahib Y. Ramachandra Rao coll; also from same galls-Tenmalai, Travancore, October 1923, Ramakrishna Ayyar coll. No. 34.

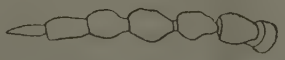


FIG. 20. Anomalous antenna of *Austrothrips cochinchinensis* Karny.

TRICHOTHRIPS HADROCERUS, N. SPEC. (Plate XXI, fig. 3, 4).

Forma macroptera (♀). General colour van Dyke brown, abdomen yellow brown, gradually endarkened distad, segments 8, 9 and tube as dark as pterothorax. Fore tibiæ gradually becoming yellow distad ; middle and hind tibiæ not paler than femora or only yellow at extreme tips. All tarsi pale yellow, with a black spot. Antenna segments 1 and 6 to 8 dark grey brown ; 2nd yellow brown, 3rd brownish yellow, 4th yellow brown, 5th darker than 4, but paler than 6. Wings clear.

Head a little longer than wide, cheeks parallel. Postocular bristles hyaline, slightly dilated at apex, hardly as long as width of eye. Eyes black, not protruding, occupying not quite one-third of the length of head. Ocelli arranged in a rectangular triangle, well developed, with red pigment-cups. Anterior one situated on a line drawn through the fore margins of eyes, posterior ones on or close behind a line drawn through the centre of the eyes.

Insertion of antennae normal to the genus, 1st joint touching the fore angle of eye. Antennae (Fig. 21 *a*) moderately long and very stout, middle joints almost globular, with a short basal pedicel, third joint more obconical, asymmetrical, viz. outside (posteriorly) more angulated, inside (anteriorly) more rounded. Sense-area of 2nd joint circular, situated either in the middle of joint or only slightly distad from it. Sense-cones hyaline, comparatively long and thick.

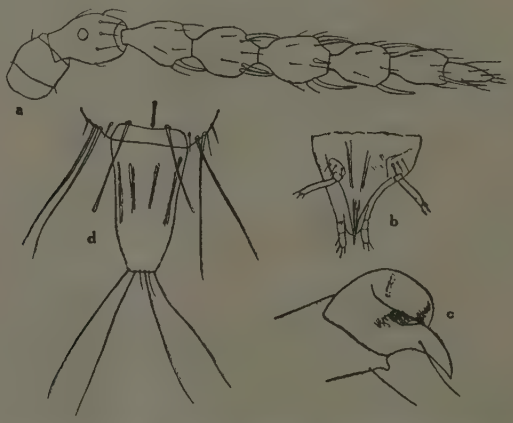


FIG. 21. *Trichothrips hadrocerus*, n. sp., macropterous ♀. *a* antenna ; *b* mouth cone ; *c* fore tarsus ; *d* tube.

Mouth cone (Fig. 21 *b*) hardly extending beyond middle of prosternum, strongly tapering distad, narrowly rounded at apex. The sharply pointed labrum extends beyond the tip of the mouth cone. Palpi moderately long, 2-jointed.

Pronotum almost as long as head, strongly widened backwards. Bristles moderately thick, yellowish hyaline, funnel-shaped at apex. Posterolaterals hardly

one-third of the median length of pronotum; antero-laterals, mediolaterals and posteromarginals somewhat shorter, antero-marginal still shorter. Posteromarginals about three times as far remote from one another as from the posterolaterals. Mediolaterals twice as far distant from anterolaterals as from posterolaterals. Anteromarginals from one another twice as far remote as from anterolaterals. The smooth, chitinized plates of prosternum small, the space between them roughly punctured. Coxal bristle somewhat shorter than the posterolaterals, otherwise similar. Fore femora enlarged. Fore tibiae short and thick, furnished with a small tooth on the inside close to the apex (Fig. 21 *c*). Fore tarsi with a large, pointed, slightly curved tooth.

Pterothorax somewhat wider than long, sides nearly straight, somewhat converging backwards. Middle and hind legs short and thick. Wings hyaline, equally wide throughout, fore pair with 6 to 9 accessory fringe-hairs.

Abdomen almost parallel-sided, not strongly narrowed before the 8th segment. Tube (Fig. 21 *d*) very short and thick, narrowing distad, somewhat abruptly before apex. Lateral bristles hyaline, dilated at apex, the exterior one on 7th segment only slightly so, all others strongly. On 2nd segment the interior bristle somewhat shorter than the segment, the exterior one about half as long. On the following segments the interior one about as long as the segment, the exterior one increasing in length from segment to segment, on 7 both already of about equal length. 9th segment with two long bristles on either side, which are hair-like in distal part and about as long as tube. Mesad from them, there is on either side of ovipositor a shorter, distad dilated bristle. Terminal bristles about as long as tube, hair-like in distal part; the shorter ones scarcely one-fourth as long. Wing-retaining spines moderately thick, but longer than usual. On 2nd segment somewhat aborted: hind pair scarcely half as long as the distance between their tips, much thinner than those on the following segments; fore pair even somewhat shorter and thinner. On segment 3 to 7 the hind pair distinctly longer than the tip-distance, on the middle segments even twice as long, those of fore pair only a little more than half as long as the hindermost.

Forma aptera (♀, ♂).—General colour paler, yellow brown, head somewhat shaded with grey brown, abdominal segments 8, 9 and tube dark brown. Antennal segment 1 brownish yellow, 2 and 3 bright yellow, following ones coloured as in the macropterous form, but somewhat paler.

Eyes somewhat smaller, occupying only a little more than one-fourth of the length of head. Ocelli present, but much smaller than in macropterous specimens. Pterothorax as wide as in the forma macroptera, and only a little shorter than in that form. Wings absent. Wing-retaining spines quite aborted, short and hair-like, even on the middle segments not more than one-third as long as the tip-distance.

Measurements, ♀: Total length of antennae 0·30 mm.; I. joint 0·02 mm. long, 0·03 mm. wide; II. joint 0·05 mm. long, 0·034 mm. wide; III. joint 0·04 mm. long, 0·03 mm. wide; IV. joint 0·04 mm. long, 0·032 mm. wide; V. joint 0·04,

mm. long, 0·03 mm. wide; VI. joint 0·04 mm. long, 0·028 mm. wide; VII, joint 0·037 mm. long, 0·022 mm. wide; VIII. joint 0·03 mm. long, 0·01 mm. wide. Head 0·18 mm. long, 0·17 mm. wide. Prothorax 0·18 mm. long, 0·34 mm. wide (across fore coxae). Fore femora 0·20 mm. long, 0·10 mm. wide; fore tibiae (incl. tarsi) 0·13 mm. long, 0·05 mm. wide. Pterothorax 0·30 mm. long, 0·35 mm. wide. Middle femora 0·11 mm. long, 0·05 mm. wide; middle tibiae (incl. tarsi) 0·13 mm. long, 0·04 mm. wide. Hind femora 0·16 mm. long, 0·06 mm. wide; hind tibiae (incl. tarsi) 0·20 mm. long, 0·04 mm. wide. Length of wings (without fringe) 0·75 mm. Abdomen (incl. tube) 1·05 mm. long, 0·35 mm. wide. Length of tube 0·14 mm., width at base 0·08 mm., at apex 0·03 mm.—*Total length* 1·5—1·8 mm.

♂: Total length of antennae 0·29 mm; I. joint 0·025 mm. long, 0·033 mm. wide; II. joint 0·04 mm. long, 0·03 mm. wide; III. joint 0·038 mm. long, 0·028 mm. wide; IV. joint 0·04 mm. long, 0·03 mm. wide; V. joint 0·04 mm. long, 0·029 mm. wide; VI. joint 0·04 mm. long, 0·027 mm. wide; VII. joint 0·034 mm. long, 0·02 mm. wide; VIII. joint 0·03 mm. long, 0·012 mm. wide. Head 0·20 mm. long, 0·17 mm. wide. Prothorax 0·17 mm. long, 0·36 mm. wide (across fore coxae). Fore femora 0·20 mm. long, 0·10 mm. wide; fore tibiae (incl. tarsi) 0·15 mm. long, 0·05 mm. wide. Pterothorax 0·28 mm. long, 0·34 mm. wide. Middle femora 0·13 mm. long, 0·06 mm. wide; middle tibiæ (incl. tarsi) 0·16 mm. long, 0·04 mm. wide. Hind femora 0·15 mm. long, 0·06 mm. wide; hind tibiæ (incl. tarsi) 0·20 mm. long, 0·04 mm. wide. Abdomen (incl. tube) 0·85 mm. long, 0·33 mm. wide. Length of tube 0·15 mm., width at base 0·09 mm., at apex 0·03 mm.—*Total length* 1·3—1·5 mm.

Described from 8 macropterous and 2 apterous ♀♀ and from 4 apterous ♂♂, taken at Sengleteri, Tinnevelly, on leaves of a wild plant, July 1921, Ramakrishna Ayyar coll. No. VII.

This new species differs widely from all the hitherto known *Trichothrips* species, especially by the unusually thick antennæ. By the structure of fore tibiæ, it should come close to *Plectrothrips*, from which it differs, however, by the quite normal insertion of antennae and the much less developed 8th joint. The shape and structure of the tube, on the other hand, reminds somewhat of the genus *Barythrips*.

Eothrips foliiperda, n. spec. (Plate XXI, fig. 5).

♀, ♂. General colour very dark brown, tube black, paler distad. Fore tibiæ and all tarsi bright lemon yellow. 1st antennal joint as dark as the body, 2nd dark basad, then becoming gradually pale yellow distad; all other joints uniformly pale lemon yellow.

Head somewhat longer than wide, sides subparallel. Eyes not protruding, occupying about one-third of the length of head. Ocelli as in *E. ebneri* (Karny), the anterior one not overhanging, situated behind the fore margin of head between the antennæ. Postocular bristles pointed, hardly half as long as an eye, not extend-

ing beyond the cheeks laterad. Occiput with transverse, confluent striæ. Antennæ (Fig. 22) not quite twice as long as head, slender; 4th joint about three-fourths as long as 3 or 5, and not longer than 8. Joint 6 longer than all others. Mouth cone practically as in *ebneri*, hardly two-thirds as long as prothorax; apical joint of maxillary palpi scarcely four times as long as wide.

FIG. 22. *Eothrips foliiperda*, n. sp., ♀, antenna.

All prothoracic bristles brown, acutely pointed at apex. Posterolaterals and posteromarginals somewhat longer than the whole prothorax. The others reduced: anterolaterals about one-fifth of the prothoracic length, anteromarginals and mediolaterals still shorter. Posteromarginals about three times as far remote from each other as from the posterolaterals; mediolaterals in the middle between antero- and posterolaterals; anteromarginals about one and a half times as far distant from the anterolaterals as from one another. Prosternum roughly punctured; a smooth plate near either fore margin, a very small one aside of the mouth cone, and a larger, transverse one on either side before hind margin. Fore coxal bristle much reduced. Fore femora not enlarged. Fore tarsi unarmed in both sexes.

Meso and metasternal sutures practically as in *ebneri*. Middle and hind legs moderately long and stout. Wings almost reaching the fifth or sixth abdominal segment; both pairs infumate on whole surface. Subbasal bristles of fore wings brown, pointed at apex, 2nd and 3rd about equal in length, slightly longer than the breadth of wing, 1st somewhat shorter; before each bristle a very short hair. No interlocated ciliæ on hind margin.

All abdominal bristles brown, sharply pointed at apex. The inner one everywhere about as long as the segment itself; the outer one on segment 2 about half as long, then increasing in length distad, and on segment 7 it is somewhat longer than the inner bristle. On eighth segment both distinctly shorter than on the preceding segments. Bristles of ninth segment as long as the tube. Terminal bristles slightly shorter, hair-like distad; the shorter ones hardly one-third as long as the long ones. Sides of tube rather straight, converging distad. Adjacent scales in the ♂ large, very well developed. Wing-retaining spines on segments 3 to 7 dark, stout, distinctly S-curved; hind pair as long or slightly shorter than the distance between their tips. Fore pair not more than half as long as those of hind pair, and also much thinner. On second segment, those of hind pair conspicuously shorter and straight, not S-curved, those of fore pair reduced to very short, inconspicuous bristle-hairs.

Measurements: Total length of antennæ 0·45 mm.; I. joint 0·03 mm. long, 0·05 mm. wide; II. joint 0·055 mm. long, 0·04 mm. wide; III. joint 0·065 mm. long,

0·03 mm. wide; IV. joint 0·05 mm. long, 0·03 mm. wide; V. joint 0·065 mm. long, 0·03 mm. wide; VI. joint 0·07 mm. long, 0·03 mm. wide; VII. joint 0·06 mm. long. 0·022 mm. wide; VIII joint 0·05 mm. long, 0·014 mm. wide. Head 0·24 mm. long, 0·21 mm. wide. Prothorax 0·15 mm. long, 0·39 mm. wide (across fore coxæ). Fore femora 0·18 mm. long, 0·095 mm. wide; fore tibiæ (incl. tarsi) 0·22 mm. long, 0·055 mm. wide. Pterothorax 0·37 mm. long, 0·43 mm. wide. Middle femora 0·16 mm. long, 0·07 mm. wide; middle tibiæ (incl. tarsi) 0·24 mm. long, 0·055 mm. wide. Hind femora 0·25 mm. long, 0·07 mm. wide; hind tibiæ (incl. tarsi) 0·29 mm. long, 0·055 mm. wide. Length of wings (without fringe) 0·9 mm. Abdomen (incl. tube) 1·2 mm. long, 0·42 mm. wide. Length of tube 0·22 mm., width at base 0·10 mm., at apex 0·05 mm.—*Total length* ♀ 1·8—2·2 mm; ♂ 1·5—2·0 mm.

Described from several ♀♀ and ♂♂, taken at Taliparamba, Malabar, on leaves of a wild creeper, 17 Septr. 1918, Ramakrishna Ayyar coll. Nos. III and IV.

Allied to the Javanese *gemmiperda* (Karny) and the African *ebneri* (Karny); the latter one was described originally as *Gynaikothrips*, but should be placed under *Eothrips*. The very long posterolateral and posteromarginal bristles and the unusually short 4th antennal joint distinguish it from both these species. From *gemmiperda*, it differs, moreover, by the better developed wing-retaining spines and by having no bristles directed mesad, in ♂ sex it differs further by the larger adjacent scales of tube; from *ebneri* by the yellow fore tibiæ and the distal antennal segments not being dark.

Androthrips flavipes, Schmutz (Plate XXII, fig. 1).

This species was originally described by Schmutz(*Sitz. Ber. Akad. Wiss. Wien, Math. nat. Kl.*, CXXII, Abt. I, p. 1031, 1913) from *Piper* leaves. Half a year later, Bagnall described under the same name, without having seen Schmutz's paper, a species from specimens got from *Memecylon umbellatum* (*Ann. Mag. Nat. Hist.* (8) XIII, p. 27; 1914). From these two descriptions, only a very few differences between *flavipes*, Schmutz and *flavipes*, Bagnall can be noted. These I have summed up in my *Androthrips*-key (*Zeitschr. wiss. Ins. Biol.*, XI, p. 90; 1915); to these, there should be added also a slight difference in antennal colouration. Nevertheless, I did not propose a new name for *flavipes*, Bagnall, because I thought it very probable that both were synonyms, the differences in the descriptions being based on mere individual characters. In fact, about the same time, Bagnall has stated this synonymy (*Ann. Mag. Nat. Hist.* (8) XV, p. 324; 1915). I am now also of the same opinion, that both belong to the same species. Nevertheless, it is very possible that *flavipes* may have developed on the different food plants into different physiological races. It seems to be so, at least, with the material now before me; but, as there are no specimens from *Piper* or from *Memecylon* in this lot, it is difficult to say anything in this respect on Schmutz's and Bagnall's specimens from the descriptions only. The shape of 4th antennal segment, as figured by Schmutz, somewhat

resembles *Physothrips antennalis* and *antennatus*, and should certainly form a curious, distinctive character; but inaccurate as Schmutz's descriptions and figures always are, it is very doubtful, whether this joint has really such a shape.

In the material before me, I can separate three different races from three different food plants, but the distinguishing characters are certainly too weak to be of specific value. I will, therefore, describe them, without proposing new names for these varieties, and more so, as it is not certain in what relation they will stand to the already described specimens from *Piper* and *Memecylon*.

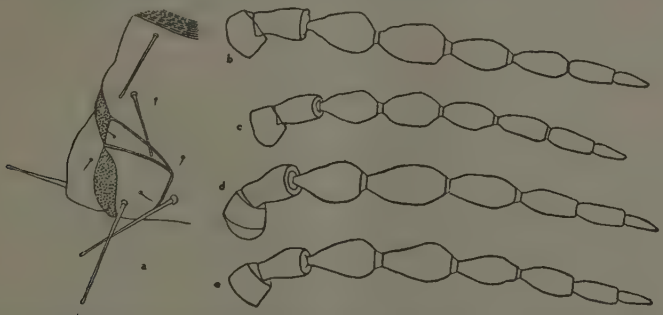


FIG. 23. *Androthrips flavipes*, Schmutz, *a* chaetotaxy of prothorax; *b-e* antennae; *b* from *Mimusops*, *c* from *Terminalia*, *d* and *e* from *Ficus retusa*.

Var. 1. General colour pale brown, immature specimens yellowish, but differing from *ochraceus* by the always darker tube and by the head shaded with greyish; further, the postocular and prothoracic bristles are longer and always knobbed at tip (Fig. 23 *a*), whilst in *ochraceus* they are short and stout, blunt at apex, but not dilated. Antennæ rather slender (Fig. 23 *d* and *e*), third to sixth joint uniformly pale yellowish, seventh shaded with grey distad, 8th pale brownish grey throughout. Fore femora of moderate size, shaded with brown in the basal and outer half. Wings slightly shaded with very pale brownish or yellowish on whole surface. 6 to 12 interlocated fringe-hairs.

30 ♀♀ from "Kollegal, Coimbatore District, damaging the leaves of *Ficus retusa* badly; the leaves do not open; in numbers." August 31st 1918, Ramakrishna Ayyar coll. No. II.

Var. 2. Dark brown. Antennæ (Fig. 23 *b*) perhaps slightly thicker than in the preceding variety; third to sixth joints bright yellow, fourth gradually becoming grey in distal half, 5th and 6th very slightly shaded with greyish distad; 7th and 8th segments wholly dark grey. All legs bright gamboge or cadmium yellow, fore femora larger than in the preceding variety, slightly shaded with brownish towards hind angle. Wings practically clear. 8 to 10 duplicated ciliæ.

3 ♀♀ from Coimbatore, on *Mimusops elengi*, together with numerous *Arrhenothrips ramakrishnae*, Ramkrishna Ayyar coll.

Var. 3. Dark grey brown. Antennæ (Fig. 23 *c*) practically as in the preceding variety, but slightly shorter; third to sixth joints pale greyish yellow, 3rd very slightly shaded with grey at apex, 4th gradually becoming grey in distal half, 5th greyish in distal third, 6th dark grey in distal half, 7th and 8th very dark grey throughout. All legs brownish yellow, fore femora even smaller than in var. 1, gradually becoming dark brown towards hind angle. Wings slightly shaded with greyish yellow. 5 to 6 accessory hairs.

1 ♀ from Travancore, "inside psyllid galls in *Terminalia* leaves," Octr. 1923, Ramkrishna Ayyar coll. No. 33.

ANDROTHRIPS RAMACHANDRAI, N. SPEC. (Plate XXII, fig. 2.)

♀, ♂. General colour blackish brown. Tip of fore femora, whole of fore tibiæ, extreme base of hind tibiæ, apices of middle and hind tibiæ, and all tarsi pale yellow. Antennal joints 1 and 2 as dark as the body; 3 to 6 pale yellowish, 3 slightly shaded with grey before apex, 4 greyish infumate in apical two-thirds, 5 in apical half, 6 dark grey in apical half, 7 and 8 wholly dark grey. Wings clear.

Head one and one-sixth to one and one half times as long as wide, sides very slightly arched, slightly converging backwards. Ocelli large, situated before the middle of eyes. Postocular bristles dark, strong, somewhat shorter than the eyes, slightly knobbed at the tip. (Antennæ Fig. 24). Mouth cone extending to the middle of prosternum, rounded.

FIG. 24. Antenna of *Androthrips ramachandrai*, n. sp.

Prothoracic and coxal bristles practically as in *flavipes*, long and strong, dilated at apex. Prosternal sculpture also as in *flavipes*. Fore femora enlarged in both sexes, with a strong, cylindrical tooth near base, sometimes with a row of very small tubercles. Fore tibiæ stout. Fore tarsus armed with a conspicuous tooth.

Mesosternal sutures forming a trapezoidal figure wider in front than behind, apposed close to the hind marginal suture of mesosternum; from either fore angle a short, oblique line running forwards and outwards; from the middle of the anterior cross line there is given off a short median long line. Metasternal sutures diverging backwards.

Forewings broad in basal part, distinctly constricted close behind the middle, beyond this very slightly widened again before apex. Subbasal bristles about equidistant, yellowish hyaline, dilated at apex; first about as long as the width of wing at the constriction, second slightly shorter, third about twice as long as second. Number of interlocated fringe-hairs 6 to 10 (usually 8 or 9).

Abdominal segments 2 to 8 near each hind angle with two long, yellowish hyaline bristles, which are slightly dilated at apex; the inner one of basal segments being somewhat shorter than the segments themselves, on 7 slightly longer; the outer one everywhere shorter than the inner. Between these two bristles, there is on every segment a short, stout, dark, pointed bristle. 9th segment with two long, hair-like bristles on either side, which are about as long as the tube, and with some short, pointed bristles. Tube somewhat more than half as long as the head, with distad converging sides. Terminal bristles scarcely shorter than tube, the shorter ones about one-third or one-fourth of the tube-length. Wing-retaining spines strong, dark; those of hind pair very strongly S-curved, on segments 3 to 6 somewhat longer than the distance between their tips, on 7 hardly more than half as long as the tip-distance, on 2 somewhat more than one-third as long; fore pair everywhere shorter and weaker than the hindermost.

Measurements, ♀: Total length of antenna 0·39 mm; I. joint 0·025 mm. long, 0·035 mm. wide; II. joint 0·05 mm. long, 0·035 mm. wide; III. joint 0·065 mm. long 0.035 mm. wide; IV. joint 0·065 mm. long, 0·035 mm. wide; V. joint 0·055 mm. long, 0·027 mm. wide; VI. joint 0·053 mm. long, 0·023 mm. wide; VII. joint 0·047 mm. long, 0·023 mm. wide; VIII. joint 0·033 mm. long, 0·015 mm. wide. Head 0·27 mm. long, 0·18 mm. wide. Prothorax 0·17 mm. long, 0·38 mm. wide (across fore coxae). Fore femora 0.26 mm. long, 0·12 mm. wide; fore tibiæ (incl. tarsi.) 0·23 mm. long, 0·05 mm. wide. Pterothorax 0·35 mm. long, 0·35 mm. wide. Middle femora 0·18 mm. long, 0·06 mm. wide; middle tibiæ (incl. tarsi) 0·24 mm. long, 0·045 mm. wide. Hind femora 0·21 mm. long, 0·07 mm. wide; hind tibiæ (incl. tarsi) 0·26 mm. long, 0·045 mm. wide. Length of wings (without fringe) 0·95 mm. width near base 0·09 mm. in the middle 0·05 mm., before apex 0·06 mm. Abdomen (incl. tube) 1·55 mm. long, 0·39 mm. wide. Length of tube 0·15 mm., width at base 0·07 mm., at apex 0·04 mm.—*Total length* 2·0—2·4 mm.

♂: Total length of antennæ 0·36 mm; I. joint 0·025 mm. long, 0·035 mm. wide; II. joint 0·04 mm. long, 0·03 mm. wide; III. joint 0·06 mm. long, 0·037 mm. wide; IV. joint 0·06 mm. long, 0·035 mm. wide; V. joint 0·05 mm. long, 0·027 mm. wide; VI. joint 0·05 mm. long, 0·02 mm. wide; VII. joint 0·042 mm. long, 0·017 mm. wide; VIII. joint 0·03 mm. long, 0·01 mm. wide. Head 0·20 mm. long, 0·17 mm. wide. Prothorax 0·17 mm. long, 0·35 mm. wide (across fore coxæ). Fore femora 0·23 mm. long, 0·13 mm. wide; fore tibiæ (incl. tarsi) 0·21 mm. long, 0·05 mm. wide. Pterothorax 0·30 mm. long, 0·32 mm. wide. Middle femora 0·16 mm. long, 0·05 mm. wide; middle tibiæ (incl. tarsi) 0·22 mm. long, 0·035 mm. wide. Hind femora 0·19 mm. long, 0·06 mm. wide; hind tibiæ (incl. tarsi) 0·24 mm. long, 0·04 mm. wide. Length of fore wings (without fringe) 0·8 mm., width at base 0·08 mm., near the middle 0·04 mm., before apex 0·055 mm. Abdomen (incl. tube) 1·1 mm. long, 0·29 mm. wide. Length of tube 0·13 mm., width at base 0·06 mm., at apex 0·03 mm.—*Total length* 1·6—2·1 mm.

I have pleasure in naming this new species in honour of its discoverer,

1 ♂ and 1 ♀ from galls on *Calycopteris floribunda*, Lamk., together with numerous *Austrothrips cochinchinensis*, Taliparamba, May 20th, 1923, Rao Sahib Ramachandra Rao coll. Some further specimens of both sexes were received under No. 34. Collected by Ramakrishna Ayyar on same food plant from Tenmalai Travancore; October 1923.

Differing from all hitherto known *Androthrips* species by the dark middle and hind tibiæ; so the specimen recorded in *Journ. Siam. Soc.* XVI, p. 129, from *Melastoma* will apparently not belong to *A. melastomæ*. Very similar in general appearance to *Haplothrips inquilinus*, Priesner, from which it differs at first view by the strong armature of fore femora.

Mesothrips melinocnemis, n. spec. (Plate XXII, fig. 4.)

♀, ♂. General colour dark brown. Apical half of fore femora, the whole of all tibiæ, all tarsi and antennal segments 3 to 8 pale lemon yellow; 8th joint slightly shaded with grey. Fore wings pale brownish infumate on whole surface, with a narrow hyaline cross band at the median constriction. Hind wings infumate especially along margins and median vein.

Head about one and one-third as long as wide. Cheeks slightly protruding behind eyes, beyond that nearly straight, converging backwards, set with some short hairs along whole length and with one very short bristle about the middle, between hind margin of eyes and that of head. Postocular bristles strong, somewhat longer than the eyes, sharply pointed at apex. Posterior ocelli situated close before middle of inner margin of eyes, slightly more distant from each other than from the anterior ocellus, which is directed forwards. (Antennæ Fig. 25.) Mouth cone not actually reaching the middle of prosternum, broadly rounded.

Fig. 25. Antenna of *Mesothrips melinocnemis*, n. sp.

Prothoracic bristles long and strong, acutely pointed at apex; posterolateral slightly shorter than prothorax, posteromarginals somewhat shorter, mediolaterals and anterolaterals not quite half as long as the posterolaterals. Fore femora enlarged, but without tooth inside near base. Fore tarsi with a small, sharply pointed tooth. Prosternal, mesosternal and metasternal structures practically as in the preceding species, but the mesosternal trapezoid structure enclosing a well-defined equilateral triangle.

Wings—except in colour—as in *Androthrips ramachandrai*. Sub-basal bristles darker, pointed at the tips; 2nd one more approximate to 3 than to 1; 1 and 2

slightly longer than the breadth of wing at the constriction, 3 conspicuously shorter. 6 to 9 doubled ciliæ.

Chætotaxy of abdomen practically as in the preceding species, but the bristles of segments 2 to 8 not knobbed and slightly longer. Posterior wing-retaining spines very strongly S-curved, on segments 4 and 5 conspicuously longer than the distance between their tips, on 6 somewhat shorter, on 3 hardly more than half as long as the tip-distance, on 2 and 7 about one-fourth of the distance. Terminal bristles slightly longer than the tube.

Measurements: Total length of antenna 0·38 mm.; I. joint 0·03 mm. long, 0·04 mm. wide; II. joint 0·05 mm. long, 0·029 mm. wide; III. joint 0·063 mm. long, 0·034 mm. wide; IV. joint 0·064 mm. long, 0·032 mm. wide; V. joint 0·055 mm. long 0·026 mm. wide; VI. joint 0·048 mm. long, 0·023 mm. wide; VII. joint 0·04 mm. long, 0·02 mm. wide; VIII. joint 0·033 mm. long, 0·009 mm. wide. Head 0·25 mm. long, 0·19 mm. wide. Prothorax 0·18 mm. long, 0·35 mm. wide (across fore coxæ). Fore femora 0·25 mm. long, 0·14 mm. wide; fore tibiæ (incl. tarsi) 0·22 mm. long, 0·05 mm. wide. Pterothorax 0·35 mm. long, 0·35 mm. wide. Middle femora 0·16 mm. long, 0·06 mm. wide; middle tibiæ (incl. tarsi) 0·19 mm. long, 0·045 mm. wide. Hind femora 0·23 mm. long, 0·07 mm. wide; hind tibiæ (incl. tarsi) 0·28 mm. long, 0·05 mm. wide. Length of fore wings (without fringe) 0·87 mm., width at base 0·075 mm., near middle 0·04 mm., before apex 0·05 mm. Abdomen 1·4 mm. long (incl. tube), 0·38 mm. wide. Length of tube 0·13 mm., width at base 0·06 mm., at apex 0·035 mm.—*Total length* ♀ 2·25 mm., ♂ 2·1 mm.

1 ♂ and 2 ♀♀ from Taliparamba, Malabar, on leaves of a wild creeper, 17 September 1918, Ramakrishna Ayyar coll. Ncs. III and IV.

Mesothrips melinocnemis resembles *Androthrips* much more than *Mesothrips*, but differs from the former genus not only by the structure of fore femora, but also by the very long, sharply pointed postocular and prothoracic bristles. By these characters, it comes under *Mesothrips*, where it differs from all the hitherto known species by the colour of *all* tibiæ (from where the name: *melinos*-pale lemon yellow).

Mesothrips apatelus, n. spec. (Plate XXII, fig. 5.)

♀. General colour pale brown, head and middle part of tube, especially along the sides, darker. Tibiæ not paler than the femora, tarsi brownish yellow. Antennal joints 1 and 2 as dark as the body, 3 to 7 pale yellowish, extreme apex of 7 and the whole of 8 shaded with pale brown.

Head cylindrical, about one and a half times as long as wide; sides straight, not or scarcely converging backwards (Fig. 26 *b*), set with some stout, very short bristles in hind part. Eyes black, not protruding. Ocelli arranged in an almost rectangular triangle, the anterior one directed forwards. Interocellar bristles

very short and weak. Postocular bristles moderately stout and long, not reaching the outer margin of eyes, blunt, but not dilated at apex.

FIG. 26. *Mesothrips apatelus*, ♀. *a* 3rd to 8th antennal segments ; *b* head and prothorax.

Antennæ (Fig. 26 *a*) comparatively slender, middle joints about three times as long as wide. Sense-area of second joint situated close before the apex. Sense-cones moderately long, on 6th joint longer, on 7th shorter than on the others. Formula :—III, 0—1 ; IV, 2—2 ; V, 1—1 ; VI, 1—1 ; VII, —1— (one on dorsum near apex).

Mouth cone reaching the middle of prosternum ; labium broadly rounded ; labrum triangular, with sinuate lateral margins, sharply pointed at apex, not or hardly extending beyond the apical margin of labium. Maxillary and labial palpi cylindrical, with short, annular basal and elongate apical joint ; maxillary ones more than twice as long as the labial palpi, and also distinctly thicker.

Prothoracic bristles stout, moderately long, blunt, but not dilated at apex. Posterolaterals and posteromarginals equal in length, about half as long as prothorax. Mediolaterals somewhat shorter, their insertion very close to the suture behind them. Anterolaterals and anteromarginals still shorter, the former not reaching the point of insertion of the mediolaterals. Arrangement and shape of prosternal plates much as in *Androthrips flavipes*. Coxal bristle short and stout. Fore femora enlarged, without any tooth. Fore tibiæ stout, unarmed. Fore tarsus with a triangular, acute tooth about half as long as the breadth of tarsus.

Pterothorax about as long as wide, with very slightly arched sides, slightly narrowed backwards. Meso-and metasternal sutures in the form of an inverted V ; in the mesosternum this is closed behind by the transverse hind margin and projects forward as a short, straight median suture. Middle and hind legs moderately long and stout. Wings reaching the 6th abdominal segment, practically clear.

Abdominal bristles of hind angles blunt, the inner about as long as the segment, the outer half as long on basal segments, then increasing in length from segment to segment, on 6th segment both equal in length, on 7th the outer longer than the inner ; on 8th the outer somewhat shorter than the segment itself, the inner still somewhat shorter than the outer. Ninth segment on either side with 3 long bristles, hair-like in apical part, as long as the tube, and between them some short, pointed bristles. Tube shorter than head, sides practically straight, converging distad. The long terminal bristles almost as long as the tube, the short ones about one-

fourth of the long ones. Wing-retaining spines on segments 2 to 7 stout, dark, distinctly S-curved. Those of fore pair everywhere a little shorter and thinner than those of hind pair. The latter on segment 2 about one-third as long as the distance between their tips, on 3 somewhat shorter than the tip-distance, on 4 and 5 somewhat longer, on 6 about as long as this distance, on 7 two-thirds of the tip-distance. Between the wing-retaining spines and the lateral margins of abdominal segments there are inserted everywhere about a dozen very short, stout, acutely pointed bristles increasing in number on basal, and decreasing on distal segments.

Measurements, ♀: Total length of antennæ 0·54 mm.; I. joint 0·025 mm. long, 0·04 mm. wide; II. joint 0·05 mm. long, 0·035 mm. wide; III. joint 0·10 mm. long, 0·035 mm. wide; IV. joint 0·105 mm. long, 0·033 mm. wide; V. joint 0·09 mm long, 0·027 mm. wide; VI. joint 0·07 mm. long, 0·28 mm. wide; VII joint 0·063 mm. long, 0·026 mm. wide; VIII. joint 0·038 mm. long, 0·012 mm. wide. Head 0·34 mm. long, 0·22 mm. wide. Prothorax 0·23 mm. long, 0·46 mm. wide (across fore coxæ). Fore femora 0·33 mm. long, 0·17 mm. wide; fore tibiæ (incl. tarsi) 0·30 mm. long, 0·08 mm. wide. Pterothorax 0·50 mm. long, 0·52 mm. wide. Middle femora 0·27 mm. long, 0·09 mm. wide; middle tibiæ (incl. tarsi) 0·38 mm. long, 0·06 mm. wide. Hind femora 0·35 mm. long, 0·09 mm. wide; hind tibiæ (incl. tarsi) 0·46 mm. long, 0·06 mm. wide. Length of wings (without fringe) 1·25 mm. Abdomen (incl. tube) 1·9 mm. long, 0·45 mm. wide. Length of tube 0·29 mm., width at base 0·10 mm., at apex 0·05 mm.— *Total length* 2·6—3·2 mm.

Described from two females taken at Kollegal, Coimbatore, together with numerous specimens of *Androthrips flavipes*, *Gynaikothrips uzeli* and *Gigantothrips elegans* " damaging the leaves of *Ficus retusa* badly; the leaves do not open", Ramakrishna Ayyar coll. No. II, Aug. 31st 1918.

This new species resembles very closely *Mesothrips jordani*, Zimmermann which occurs on the same food plant in Java, but differs from it by the much slenderer antennæ and by shape of head which is practically parallel-sided in *apatelus*, whereas it is conspicuously narrowed backwards in *jordani*. *Mesothrips apatelus* comes very much nearer to *Androthips flavipes*, of which numerous specimens were taken together with the two specimens of *apatelus* ♀♀, but the latter differs from this *Androthrips* by the absence of fore femoral tooth, by the prothoracic bristles not being dilated apically, by the mediolaterals inserted very close to the suture, and by the tips of anterolaterals not reaching the insertion of mediolaterals. In *Androthrips flavipes* (fig. 23*a*), on the other hand, the prothoracic bristles are dilated at tips, the mediolaterals are fully half as far removed from the suture as from the anterolaterals, and these latter clearly extend beyond the insertion-point of mediolaterals.

Mesothrips spec. indeterm.

In the material before me, there is also one ♂ of a *Mesothrips* from Coimbatore, taken in leaf rolls on Mango by C. K. Subramaniam, T. V. R. No. 43, March 1924.

Unfortunately, the specimen is too damaged for determination or description, having no antennæ (except joints 1 and 2) nor middle and hind legs. Nevertheless, I will shortly characterize it, because it would be of interest, if one of the ardent Indian Entomologists would succeed in rediscovering this species with more numerous and less mutilated specimens.

General colour black, fore tibiæ brownish yellow, shaded with dark brown along both margins. Head longer than wide, sides very finely granulated. Fore femora greatly enlarged. Fore tarsus with a large, stout tooth. Tube about three-fourths as long as head, sides converging distad. Length of body 2·5 mm.

RAMAKRISHNAIELLA, N. GEN.

Head distinctly longer than prothorax, about one and one-fourth times as long as broad, not swollen behind; sides very slightly arched and somewhat converging backwards, very finely granulated, with a single dark, stout, acutely pointed bristle in posterior part. Eyes moderately large, not protruding. Anterior ocellus situated behind the insertion of antennæ, not on a prominent hump, and directed forwards. In the vicinity of ocelli no conspicuous bristles. Postoculars short and weak. Antennæ 8-jointed, 7th joint very well separated from the sixth. Mouth cone broadly rounded. All legs short and stout, especially the fore femora thickened, but not greatly enlarged, not curved, inner margin not angulately excavate, without any tooth. Fore tibiæ unarmed; fore tarsus practically unarmed. Wings not constricted in the middle. 8th abdominal segment (Fig. 27 *c*, *d*) on either margin before the middle with a blunt tubercle, somewhat resembling *Kakothrips*, more distinct in the ♂ than in the ♀.

I have allowed myself the pleasure of naming this interesting new genus in honour of its discoverer, the merited Indian Entomologist Mr. Ramakrishna Ayyar.

This genus very closely resembles in many respects the genus *Gynaikothrips*, but may be distinguished from it at once by the presence of a stout genal bristle and by the structure of the 8th abdominal segment.

RAMAKRISNAIELLA UNISPINA, N. SPEC.

(Plate XXII, fig. 6.)

♀, ♂. General colour black, fore tibiæ yellowish brown, shaded with black along both sides. 2nd antennal joint paler distad, 3 to 6 uniformly dark yellow, 7 and 8 uniformly blackish. Wings with greyish yellow infumation over whole surface.

Head (Fig. 27*b*) about one and one-fourth times as long as wide, otherwise as described for the genus. Ocelli situated before the middle of eyes. Antennæ stout with rather thick joints (Fig. 27*a*). Sense area of second joint situated close before

the apex. Sense-cones on 3 and 4 thick and moderately long, on 5 and 6 very long and slender. Formula :—III, 0—1 ; IV, 1—2^{+1} ; V, 1—1 ; VI, 1—1 ; VII, —1— (one on dorsum near apex).

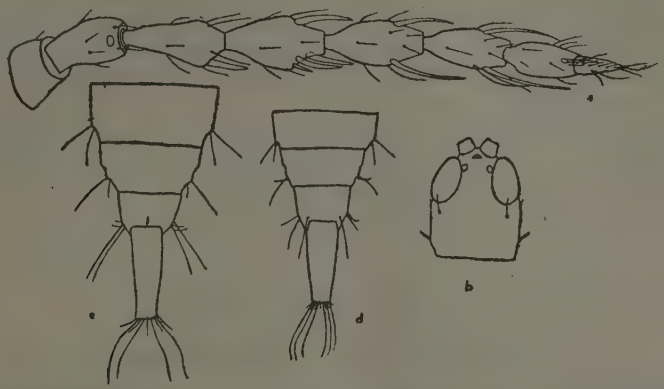


Fig. 27. *Ramakrishnaiella unispina*, n. gen., n. sp. *a* antenna ; *b* head ; *c* and *d* end of abdomen ; *c* ♀, *d* ♂.

Prothoracic and coxal bristles moderately stout and not very long, blunt at apex. Fore legs as described for the genus ; fore tarsus unarmed in ♀, in ♂ with a small and very blunt tooth which is wider at base than long. Sides of pterothorax arched, tapering backwards. Wings reaching almost to the 6th abdominal segment, equally wide throughout, fore pair with 14 or 15 duplicated ciliæ.

Abdominal bristles pale, blunt at apex, on basal segments the inner ones longer than the outer ones, the latter increasing in length from segment to segment, on 7 and 8 they are longer than the inner ones. Bristles of 9th segment pointed, rather hair-like in distal part, conspicuously shorter than the tube. Terminal bristles of the same shape, the longer ones shorter than the tube, the shorter ones about two-fifths of the longer ones. Tube as long as width of the head. Wing-retaining spines strongly S-curved, the fore pair everywhere much shorter and thinner than the hind pair. The latter on segment 2 about one-third as long as the distance between their tips, on 3 to 5 about as long as the tip-distance or somewhat shorter, on 6 and 7 not visible because of the dark colour of these segments.

Measurements, ♀, ♂ : Total length of antennæ 0·44 mm. ; I. joint 0·03 mm. long, 0·038 mm. wide ; II. joint 0·05 mm. long, 0·032 mm. wide ; III. joint 0·07 mm, long, 0·033 mm. wide ; IV. joint 0·073 mm. long, 0·038 mm. wide ; V. joint 0·068 mm. long, 0·032 mm. wide ; VI. joint 0·06 mm. long, 0·029 mm. wide ; VII. joint 0·053 mm. long, 0·024 mm. wide ; VIII. joint 0·038 mm. long, 0·013 mm. wide. Head 0·26 mm. long, 0·21 mm. wide. Prothorax 0·17 mm. long, 0·35 mm.

wide (across fore coxæ). Fore femora 0·20 mm. long, 0·11 mm. wide; fore tibiæ (incl. tarsi) 0·19 mm. long. 0·055 mm. wide. Pterothorax 0·33 mm. long, 0·36 mm. wide. Middle femora 0·14 mm. long, 0·05 mm. wide; middle tibiæ (incl. tarsi) 0·20 mm. long, 0·045 mm. wide. Hind femora 0·21 mm. long, 0·075 mm. wide; hind tibiæ (incl. tarsi) 0·32 mm. long, 0·05 mm, wide. Length of wings (without fringe) 0·85 mm. Abdomen (incl. tube) 1,3 mm. long, 0·37 mm. wide. Length of tube 0·20 mm., width at base 0·075 mm., at apex 0·043 mm.—*Total length* ♀ 2·0—2·5 mm.; ♂ 1·8-2·0 mm.

Described from 4 ♀♀ and 3 ♂♂ taken at Taliparamba, Malabar, on leaves of a wild plant, 16th September 1918, Ramakrishna Ayyar coll No. VIII.

Easily distinguishable by the generic characters.

Gynaikothrips uzeli, Zimmermann.

(Plate XXII, fig. 3 and Plate XXIII, fig. 1.)

A series of specimens of this very common and widely spread species from Kollegal, Coimbatore, "damaging the leaves of *Ficus retusa* badly; the leaves do not open; in numbers," together with numerous *Androthips flavipes*, some *Gigantothrips elegans*, and two ♀♀ of *Mesothrips apatelus*, Aug. 31st 1918, Ramakrishna Ayyar coll. No. II.

2 of the ♀♀ now before me have a distinct fore tarsal tooth, whilst one of the ♂♂ has the tube distinctly shorter than head. Otherwise, these specimens do not differ in any respect from the typical ones with which they were collected.

Gynaikothrips chaviciæ (Zimmermann).

1 mutilated ♀, taken together with some *Gynaikothrips pallipes* from Wynad, on pepper leaf, November 1918; Ramakrishna Ayyar coll. No. 31.

KEY TO THE SPECIES OF *GYNAIKOTHRIPS* WITH YELLOW MIDDLE AND HIND TIBIÆ.

1. Antennæ about twice as long as head, uniformly grey brown, or joints 3 to 6 pale basad only. 3 to 7 duplicated ciliæ . . . . . 2.
   Antennal joints 3 to 6 quite yellow . . 3.

2. Fore wings greyish infumate, slightly constricted close behind the middle. Antennæ uniformly grey brown. Head one and one-fourth times as long as wide. Tube 0·66 to 0·75 times as long as head. Length of body 1·6—1·8 mm. In leaf galls on *Dipterocarpus crinitus* . . . . . comp. *Cryptothrips pusillus*, Karny.

Fore wings not narrowed in the middle, slightly yellowish, with a well defined median vein. Antennal joints 3 to 6 pale basad. Head one and one-third times as long as wide. Tube 0·6 as long as head. Length of body 1·3—2·0 mm. In leaf galls on *Ficus punctata* . . . . . *Gynaikothrips longicornis*, Karny.

3. Prothoracic bristles sharply pointed . . . 4.

Prothoracic bristles blunt or slightly dilated at the tips . . . . . 6.

4. Antenal joint 8 and tip of 7 slightly darker than the preceding ones. Head more than one and a half times (1·52 to 1·61) as long as wide. Wings smoky especially along margins and median vein; about 12 duplicated ciliæ. Tube 0·66 to 0·72 as long as head. Length of body 2·1—2·9 mm. In leaf galls on *Vitis lanceolaria* . . . . . *Gynaikothrips pallicrus*, Karny.

Antennal joints 3 to 8 uniformly yellow. Head less than one and a half times as long as wide . . . 5.

5. Head about 1·42 times as long as broad. Wings reaching eighth abdominal segment, ciliæ smoky. Tube 0·6 as long as head. Length of body 1·9 mm. In leaf galls on *Piper nigrum* . . . . . *Gynaikothrips karnyi*, Bagnall.

Head about 1·3 times as long as broad. Wings reaching sixth abdominal segment, yellowish, with indistinct darker long stripe; 12 duplicated ciliæ. Tube 0·8 as long as head. Length of body 2·2 mm. In leaf galls on *Pavetha hispida* (sec. Schmutz also on *Piper*; but these, I believe, will not belong to the same species) . . . . . *Gynaikothrips mirabilis*, Schmutz.

6. Head twice as long as wide. Middle joints of antennæ about 4 times as long as wide; apical part of 7 and the whole of 8 brownish. Wings clear, 12 to 20 duplicated ciliæ. Tube 0·65 as long as head. Length of body 3—3·7 mm. In leaf galls on *Planchonia valida* . . . . . *Gynaikothrips gracilis*, Karny.

Head about one and one-third to one and two-thirds as long as wide . . . . . 7.

7. Wings clear or very slightly yellowish . . . 8.

Wings brownish infumate, especially along median vein. Tube about 0·8 as long as head . . 10.

8. Middle antennal joints about 3 times as long as wide, 3 to 7 bright yellow, 7 sometimes infumate at extreme tip, 8 grey brown. Head 1·37 to 1·48 times as long as wide. 14 or 15 duplicated ciliæ. Tube 0·68 as long as head. Length of body 1·8—2·5 mm. In leaf galls on *Terminalia* . . . . *Gynaikothrips interlocatus*, n. sp.

7th antennal joint greyish in apical half or third. Head 1·5 to 1·58 times as long as wide. 6 to 9 duplicated ciliæ. Tube 0·65 to 0·67 as long as head . . . . . 9.

9. Middle antennal joints about 3 times as long as wide. Length of body 1·6—2·2 mm. In leaf galls on *Dipterocarpus alatus* . . . . . *Gynaikothrips siamensis*, Karny.

Middle antennal joints about 4 times as long as wide. Length of body 2—2·5 mm. In leaf galls on *Eugenia spec.* . . . . . *Gynaikothrips dactymon*, Karny.

10. Antennæ 8-jointed. Middle antennal segments about twice as long as wide; 3 to 6 yellow, 7 and 8 quite dark brown. Head 1·3 to 1·4 times as long as wide. 7 to 10 duplicated ciliæ. Length of body 1·9—2·5 mm. In leaf galls on *Piper* . . . . *Gynaikothrip pallipes*, Karny.

Of the following species only one antenna hitherto known, this being 7-jointed. Middle antennal segments about 4 to 5 times as long as wide; all joints, except 1 and 2, quite yellow. Head one and a half times as long as wide. 2 to 3 duplicated ciliæ. Length of body 2·2 mm. In leaf galls on *Ficus spec.* . . . . *Gynaikothrips inquilinus*, Karny.

GYNAIKOTHRIPS INTERLOCATUS, N. SPEC.

(Plate XXIII, fig. 6.)

♀, ♂. General colour black, all tibiæ and tarsi uniformly bright yellow. Second antennal joint becoming paler distad, 3 to 7 uniformly dark yellow, the 7th sometimes slightly shaded with greyish at extreme tip, 8 uniformly brownish grey. Wings clear, transparent.

Head two-fifths or one-half longer than wide; cheecks sub-parallel, very slightly arched and somewhat converging backwards, very finely granulated (visible under high magnifications only), set with some very short, weak hairs. Eyes relatively small, occupying somewhat more than one-third of the head-length, not protruding. Postocular bristles black, thick, short, not reaching the hind margin of eyes, and hardly dilated at apex. (Antennæ Fig. 28.)

FIG. 28. Antenna of *Gynaikothrips interlocatus*, n. sp.

Prothoracic bristles shaped as postoculars; posteromarginals and posterolaterals of same length, hardly half as long as prothorax; the others shorter. Fore legs moderately stout and long, femora not enlarged, tarsi unarmed. Pterothorax as long as wide, somewhat narrowing backwards, with slightly arched sides. Wings not constricted in the middle; subbasal bristles thick and dark, very slightly dilated at apex, equidistant, not quite as long as the breadth of wing, the middle one slightly shorter than the others. 14 to 15 interlocated ciliæ.

Abdominal bristles dark, stout, blunt or very slightly dilated at apex; the inner one everywhere about as long as the segments themselves, the outer one about half as long on basal segments, gradually increasing in length distad, on 7 and 8 they are longer than the inner one. Bristles of 9th segment stout basad, hair-like distad, not quite as long as tube. The tube about as long as the width of head; sides converging, distad slightly more than basad. Terminal bristles shaped as those of 9th

segment, the longer ones shorter than tube, the shorter ones about two-fifths as long as the long ones. Wing-retaining spines thick, S-curved, fore pair much shorter and thinner than hind pair. The latter on segment 2 not quite half as long as the distance between their tips, on 3 slightly shorter than the tip-distance, on 4 to 6 somewhat longer than this distance, on 7 weak and hair-like, somewhat shorter than on the preceding segments.

Measurements, ♀: Total length of antenna 0·49 mm.; I. joint 0·03 mm. long, 0·04 mm. wide; II. joint 0·055 mm. long, 0·032 mm. wide; III. joint 0·085 mm. long, 0·028 mm. wide; IV. joint 0·08 mm. long, 0·033 mm. wide; V. joint 0·075mm. long, 0·03 mm. wide; VI. joint 0·075 mm. long, 0·03 mm. wide; VII. joint 0·06 mm. long 0·023 mm. wide; VIII. joint 0·03 mm. long, 0·01 mm. wide. Head 0·31 mm, long, 0·21 mm. wide. Prothorax 0·20 mm. long, 0·39 mm. wide (across fore coxæ). Fore femora 0·24 mm. long, 0·09 mm. wide; fore tibiæ (incl. tarsi) 0·28 mm. long, 0·05 mm. wide. Pterothorax 0·40 mm. long, 0·40 mm. wide. Middle femora 0·20 mm. long, 0·065 mm. wide; middle tibiæ (incl. tarsi) 0·27 mm. long, 0·04 mm. wide. Hind femora 0·29 mm. long, 0·075 mm. wide; hind tibiæ (incl. tarsi) 0·37 mm. long, 0·045 mm. wide. Length of wings (without fringe) 0·8 mm. Abdomen (incl. tube) 1·5 mm. long, 0·42 mm. wide. Length of tube 0·21 mm., width at base 0·08 mm., at apex 0·04 mm.—*Total length* 2·4 mm.

♂: Total length of antennæ 0·405 mm.; I. joint 0·025 mm. long, 0·035 mm. wide; II. joint 0·045 mm. long, 0·027 mm. wide; III. joint 0·075 mm. long, 0·023 mm. wide; IV. joint 0·07 mm. long, 0·03 mm. wide; V. joint 0·065 mm. long, 0·027 mm. wide; VI. joint 0·055 mm. long, 0·024 mm. wide; VII. joint 0·045 mm. long, 0·02 mm. wide; VIII. joint 0·025 mm. long, 0·01 mm. wide. Head 0·26 mm. long, 0·19 mm. wide. Prothorax 0·15 mm. long, 0·31 mm. wide (across fore coxæ). Fore femora 0·21 mm. long, 0·09 mm. wide; fore tibiæ (incl. tarsi) 0·26 mm. long, 0·04 mm. wide. Pterothorax 0·32 mm. long, 0·33 mm. wide. Middle femora 0·20 mm. long, 0,06 mm. wide; middle tibiæ (incl. tarsi) 0·23 mm. long, 0·04 mm. wide. Hind femora 0·24 mm. long, 0·07 mm. wide; hind tibiæ (incl. tarsi) 0·31 mm. long, 0·04 mm. wide. Length of wings (without fringe) 0·75 mm. Abdomen (incl. tube) 1·1 mm. long, 0·30 mm. wide. Length of tube 0·18 mm., width at base 0·075 mm., at apex 0·035 mm.—*Total length* 1·8 mm.

Described from 2 ♀♀ and 1 ♂ taken in Travancore, "inside psyllid galls in *Terminalia* leaves," October 1923, Ramakrishna Ayyar coll. No. 33.

This species may be distinguished from the hitherto known *Gynaikothrips* species with quite yellow middle and hind tibiæ by the key given above.

Gynaikothrips pallipes, Karny.

Some damaged specimens (all having the antennæ broken off at base of 3rd joint), from Wynad in tender leaf rolls of pepper, together with one specimen of *Gynaikothrips chavicae*, November 1918; Ramakrishna Ayyar coll. No. 31.

Dinothrips sumatrensis, Bagnall.

(Plate XXIII, figs. 2, 3.)

Some ♀♀ from Taliparamba, Malabar, under the bark of a wooden post in a shed, September 1918, Ramakrishna Ayyar coll. No. XVII.

One of the specimens has one antenna anomalous, whilst the other is quite normal (Plate VIII, fig. 4).

Mouth cone rather pointed somewhat reminding *Liothrips-Ethirothrips*.

Gigantothrips tibialis, Bagnall.

(Plate XXIII, fig. 4.)

Several specimens from leaves of *Careya arborea*, Taliparamba, Malabar, Sept. 30th 1923, Y. Ramachandra Rao coll. T. V. R. No. 36 ; originally described from Ceylon, from the same food plant.

Gigantothrips elegans, Zimmermann.

(Plate XXIII, fig. 5.)

Some specimens from Perur, Coimbatore, on leaves of *Ficus retusa*, April 1922 Ramakrishna Ayyar coll. No. I. ; and from Kollegal, Coimbatore, " damaging the leaves of *Ficus retusa* badly ; the leaves do not open ; in numbers ;" Aug. 31st 1918, Ramakrishna Ayyar coll. No. II.

The specimens now before me are somewhat paler than the typical ones from Java, and have the middle tibiæ only slightly brownish at base or—even quite yellow ; differs, nevertheless, from the preceding species not only by the hind tibiæ being always dark brown basally but also by some slight, but apparently constant differences in shape of head and antennal structure.

PLATE XVI.

FIG. 1. Hydatothrips ramaswamiahi, n. sp., larva.

FIG. 2. Hydatothrips ramaswamiahi, n. sp., ♂.

FIG. 3. Hydatothrips ramaswamiahi, n. sp., ♀.

FIG. 4. Tryphactothrips mundus, n. sp., ♀.

FIG. 5. Heliothrips indicus, Bagnall, ♀.

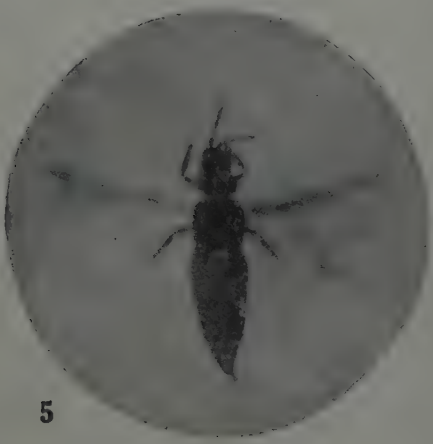
FIG. 6. Rhipiphorothrips cruentatus, Hood, ♀ with anomalous, asymmetrical head.

1

2

3

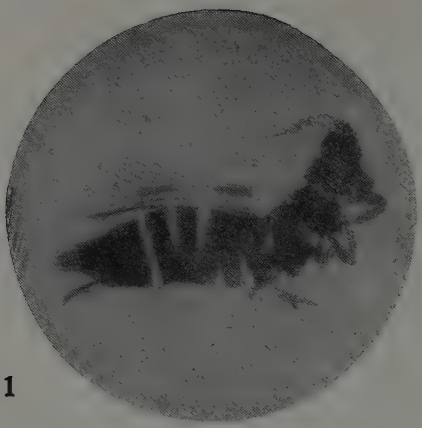
4



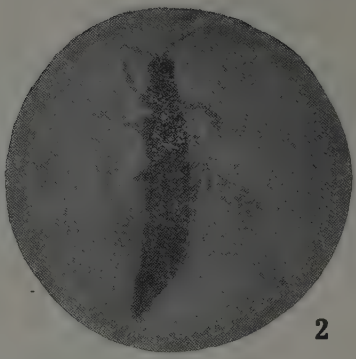
5

6

PLATE XVII.

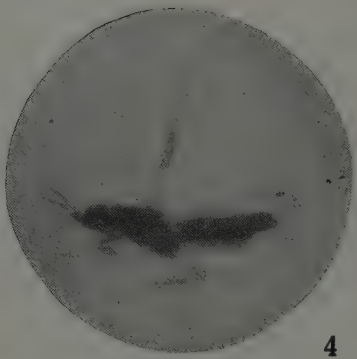


1



2

3



4

5

6

PLATE XVII

FIG. 1. Ayyaria chætophora, n. gen., n. sp., ♀.

FIG. 2. Frankliniella sulphurea, Schmutz, ♀.

FIG. 3. Tæniothrips longistylus, Karny, ♀.

FIG. 4. Tæniothrips longistylus, Karny, ♂ having both antennæ anomalous, "Ceratothripoid."

FIG. 5. Physothrips minor, Bagnall, ♀.

FIG. 6. Isoneurothrips orientalis, Bagnall, ♀.

PLATE XVIII.

Fig. 1. Isoneurothrips orientalis, Bagnall, ♂.

Fig. 2. Thrips florum, Schmutz, ♀, from Hibiscus flowers.

Fig. 3. Thrips florum, Schmutz, ♂, from Banana flowers.

Fig. 4. Mycterothrips setiprivus, n. sp., ♀.

Fig. 5. Anaphothrips oligochætus, n. sp., ♀.

Fig. 6. Anaphothrips ramakrishnai, n. sp., ♂.

1

2

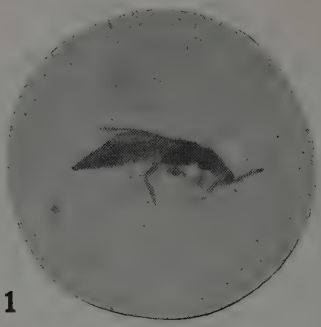
3

4

5

6

PLATE XIX.



1

2

3

4

5

6

PLATE XIX.

Fig. 1. Perissothrips parviceps Hood, ♀.

Fig. 2. Bregmatothrips binervis, Kobus, ♀.

Fig. 3. Bregmatothrips binervis, Kobus, ♀.

Fig. 4. Stylothrips brevipalpis, n. gen., n. sp., ♀.

Fig. 5. Ramaswamiahell a subnudula, n. gen., n. sp., ♀.

Fig. 6. Ramaswamiahella subnudula, n. gen., n. sp., ♂.

PLATE XX.

Fig. 1. Arrhenothrips ramakrishnæ, Hood.

Fig. 2. Dolichothrips ochripes, n. sp.

Fig. 3. Haplothrips soror, Schmutz, ♀.

Fig. 4. Rhynchothrips pallipes, n. sp.

Fig. 5. Neoheegeria indica, Hood.

Fig. 6. Eurhynchothrips ordinarius (Hood).

1

2

3

4

5

6

PLATE XXI.

1

2

3

4

5

6

PLATE XXI.

FIG. 1. Haplothrips ganglbaueri, Schmutz, ♂ with anomalous left antenna.

FIG. 2. Haplothrips ramakrishnai, n. sp., ♀.

FIG. 3. Trichothrips hadrocerus, n. sp., macropterous ♀.

FIG. 4. Trichothrips hadrocerus, n. sp., apterous ♂.

FIG. 5. Eothrips foliiperda, n. sp., ♀.

FIG. 6. Austrothrips cochinchinensis, Karny.

PLATE XXII.

FIG. 1. Androthrips flavipes, Schmutz, ♀, from Ficus retusa

FIG. 2. Androthrips ramachandrai, n. sp., ♂.

FIG. 3. Gynaikothrips uzeli, Zimmermann.

FIG. 4. Mesothrips melinocnemis, n. sp., ♂.

FIG. 5. Mesothrips apatelus, n. sp., ♀.

FIG. 6. Ramakrishnaiella unispina n. gen., n. sp., ♂.

1

2

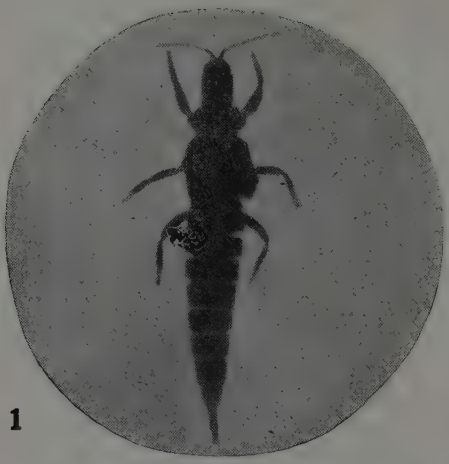
3

4

5

6

PLATE XXIII.



1

2

3

4

5

6

PLATE XXIII.

Fig. 1. Gynaikothrips uzeli, Zimmermann, ♂ with anomalous short tube.

Fig. 2. Dinothrips sumatrensis, Bagnall, ♀.

Fig. 3. Dinothrips sumatrensis, Bagnall, head of a ♀ having one antenna anomalous.

Fig. 4. Gigantothrips tibialis, Bagnall.

Fig. 5. Gigantothrips elegans, Zimmermann.

Fig. 6. Gynaikothrips interlocatus, n. sp., ♀.

PUBLICATIONS OF THE IMPERIAL DEPARTMENT OF AGRICULTURE IN INDIA

TO BE HAD FROM

THE MANAGER, GOVERNMENT OF INDIA CENTRAL PUBLICATION BRANCH, 8, HASTINGS STREET, CALCUTTA;

THE OFFICE OF THE AGRICULTURAL ADVISER TO THE GOVERNMENT OF INDIA, PUSA, BIHAR;

AND

ALL AGENTS FOR SALE OF GOVERNMENT PUBLICATIONS.

A complete list of the publications of the Imperial Department of Agriculture in India can be obtained on application from the above-mentioned.

These publications are:—

1. The *Agricultural Journal of India*. A Journal dealing with subjects connected with agricultural economics, field and garden crops, economic plants and fruits, soils, manures, methods of cultivation, irrigation, climatic conditions, insect pests, fungus diseases, co-operative credit, agricultural cattle, farm implements, and other agricultural matters in India. Illustrations, including coloured plates, form a prominent feature of the Journal. It is edited by the Agricultural Adviser to the Government of India, and is issued once every two months or six times a year. *Annual Subscription*, Rs. 6 or 9*s*. 6*d*., including postage. Single copy, R. 1-8 or 2*s*.
2. Scientific Reports of the Agricultural Research Institute, Pusa.
3. Annual Review of Agricultural Operations in India.
4. Proceedings of the Board of Agriculture in India.
5. Proceedings of Sectional Meetings of the Board of Agriculture.
6. Memoirs of the Imperial Department of Agriculture in India.
   - (*a*) Botanical Series.
   - (*b*) Chemical Series.
   - (*c*) Entomological Series.
   - (*d*) Bacteriological Series.
   - (*e*) Veterinary Series.
7. Bulletins issued by the Agricultural Research Institute, Pusa.
8. Indigo Publications.
9. Books.

The following are the publications of the last two years:—

Scientific Reports of the Agricultural Research Institute, Pusa (including the Reports of the Imperial Dairy Expert, the Physiological Chemist, and Secretary, Sugar Bureau), for the year 1923-24. Price, R. 1 or 1*s*. 8*d*.

Scientific Reports of the Agricultural Research Institute, Pusa (including the Reports of the Imperial Dairy Expert, Physiological Chemist, Government Sugarcane Expert, and Secretary, Sugar Bureau), for the year 1924-25. Price, R. 1 or 1*s*. 8*d*.

Review of Agricultural Operations in India, 1923-24. Price, R. 1-9 or 2*s*. 9*d*.

Review of Agricultural Operations in India, 1924-25. Price, R. 2-2 or 4*s*.

Proceedings of the Board of Agriculture in India, held at Pusa on 7th December, 1925, and following days (with appendices). Price, R. 1-14 or 3*s*. 3*d*.

MEMOIRS OF THE DEPARTMENT OF AGRICULTURE IN INDIA

Botanical Series

Vol. XIII, No. I. Studies in Indian Tobaccos. No. 4.—Parthenocarpy and Parthenogenesis in the varieties of *Nicotiana Tabacum* L. var. *Cuba* and var. *Mirodato*, by GABRIELLE L. C. HOWARD, M.A., and KASHI RAM. No. 5.—The Inheritance of Characters in *Nicotiana rustica* L., by GABRIELLE L. C. HOWARD, M.A. Price, Rs. 2 or 2*s*. 9*d*.

Vol. XIII, No. II. The Wilt Disease of Safflower, by S. D. JOSHI, B.SC. Price, R. 1 or 1*s*. 6*d*.

Vol. XIII, No. III. Studies in Indian Fibre Plants, No. 3. On the Inheritance of Characters in *Hibiscus Sabdariffa* L., by ALBERT HOWARD, C.I.E., and GABRIELLE L. C. HOWARD, M.A. Price, Rs. 2 or 3*s*.

Vol. XIII, No. IV. The Mahali Disease of Coconuts in Malabar, by S. SUNDARARAMAN, M.A., and T. S. RAMAKRISHNAN, B.A. Price, As. 12 or 1*s*.

Vol. XIII, No. V. The Eradication of *Cyperus rotundus* L. A Study in Pure and Applied Botany, by S. B. RANADE, B.SC., and arranged and written by W. BURNS, D.SC. Price, Rs. 2 or 3*s*.

Vol. XIII, No. VI. Studies in Diseases of the Jute Plant. (2) *Macrophoma Corchori* Saw., by F. J. F. SHAW, D.SC., A.R.C.S., F.L.S. Price, As. 8 or 9*d*.

Vol. XIV, No. I. A Study of Some Indian Grasses and Grasslands, by W. BURNS, D.SC., L. B. KULKARNI, M.AG., and S. R. GODBOLE, B.SC., B.AG. Price, As. 12 or 1*s*. 3*d*.

Vol. XIV, No. II. Studies in Gujarat Cottons, Part III. The Wagad Cotton of Upper Gujarat, Kathiawad and Kutch, by MAGANLAL L. PATEL, M.AG., and D. P. MANKAD. Price, R. 1-4 or 2*s*. 3*d*.

Chemical Series

Vol. VII, No. IV. Some Digestibility Trials on Indian Feeding Stuffs, by P. E. LANDER, M.A., D.SC., A.I.C. and PANDIT LALL CHAND DHARMANI, L.AG. Price, As. 12 or 1*s*.

Vol. VII, No. V. The Buffer Action of Some Burma Soils, by J. CHARLTON, M.SC. Price, As. 12 or 1*s*.

Vol. VII, No. VI. Studies in the Chemistry of Sugarcane, II. Some Factors that determine the ripeness of Sugarcane, by B. VISWANATH, F.I.C., and S. KASHINATHA AYYAR, B.A. Price, As. 8 or 9*d*.

Vol. VII, No. VII. The Phosphatic Nodules of Trichinopoly and the availability of Flour Phosphate as a Manure for Paddy, by RAO SAHIB M. R. RAMASWAMI SIVAN, B.A., DIP. AGRI. Price, R. 1-4 or 2*s*.

Vol. VIII, No. I. The Quality and Yield of Tobacco as influenced by Manurial and other Operations, by J. N. MUKERJI, B.A., B.SC. Price, As. 8 or 9*d*.

Vol. VIII, Nos. II—IV. Investigations on Indian Opium. No. 4.—Further Experiments on the Influence of Manures on the Yield and Morphine Content of the Latex of the Opium Poppy, by HAROLD E. ANNETT, D.SC., F.I.C., M.S.E.A.C., and HARDAYAL SINGH, B.SC. No. 5.—Experiments on Oil-content of the Seed of the Opium Poppy; and No. 6.—Studies on the Ash Constituents of Indian Opium, by HAROLD E. ANNETT, D.SC., F.I.C., M.S.E.A.C., and M. N. BOSE, M.A. Price, As. 8 or 10*d*.

Vol. VIII, No. V. Nitrogen Recuperation in the Soils of the Bombay Deccan, Part I, by D. L. SAHASRABUDDHE, M.AG., M.SC., and J. A. DAJI, B.AG., B.SC. Price, As. 4 or 5*d*.

Vol. VIII, No. VI. The Determination of available Phosphoric Acid of Calcareous Soils, by SURENDRALAL DAS, M.SC. Price, As. 12 or 1*s*. 3*d*.

Vol. VIII, No. VII. Deterioration of Sugarcane during its Storage by Windrowing, by PHANI BHUSAN SANYAL, M.SC. Price, As. 6 or 8*d*.

Vol. VIII, No. VIII. Drainage Waters at Cawnpore, by H. N. BATHAM, M.A., F.I.C.S. Price, As. 10 or 1*s*.

Vol. VIII, No. IX. Nutrients required for Milk Production with Indian Foodstuffs, by F. J. WARTH, M.SC., LABH SINGH, L.AG., B.SC. (AG.), and S. M. HUSAIN, B.SC. Price, As. 14 or 1*s*. 6*d*.

Vol. VIII, No. X. Silage Experiments at Nagpur, by HAROLD E. ANNETT, D.SC., F.I.C., M.S.E A.C., and A. R. PADMANABHA AIYER, B.A. Price, As. 10 or 1*s*.

Vol. VIII, No. XI. Nutrients required for Growth Production with Indian Foodstuffs, by F. J. WARTH, M.SC., and IZAZ AHMAD, B.SC. (AG.) Price, As. 3 or 4*d*.

Entomological Series

Vol. VIII, Nos. V—IX. Papers on Indian Tabanidæ, by P. V. ISAAC, B.A., D.I.C., M.SC., F.E.S.; Two Drosophilidæ from Coimbatore and a New Aphidiphagous Fly, by J. R. MALLOCH; Notes on Indian Odonata in the Pusa Collection, by MAJOR F. C. FRASER, I.M.S.; On New and Old Oriental Cicindelidæ, by Dr. WALTHER HORN. Price, R. 1-4 or 2*s*.

Vol. VIII, Nos. X & XI. Papers on Indian Tabanidæ, by P. V. ISAAC, B.A., D.I.C., M.SC., F.E.S.; and Some Indian Species of the Dipterous Genus *Atherigona*, Rondani, by J. R. MALLOCH. Price, R. 1-8 or 2*s*.

Vol. VIII, No. XII. The Nim Mealy Scale (*Pulvinaria maxima*, Green), by T. V. RAMAKRISHNA AYYAR, B.A., F.E.S. Price, R. 1-4 or 2*s*.

Vol. IX, Nos. I—III. A Contribution towards a Monograph of the Indian Coniopterygidæ (Neuroptera), by C. L. WITHYCOMBE, PH.D., M.SC., D.I.C.; Papers on Indian Tabanidæ and Some Observations on the Life-history and Habits of *Phycus brunneus*, Wied. (Family Therevidæ), by P. V. ISAAC, B.A., M.SC., D.I.C., F.E.S. Price, Rs. 2-2 or 4*s*.

Vol. IX, No. IV. The Red Pumpkin Beetle, *Aulacophora abdominalis*, Fb. (Coleoptera: Chrysomelidæ) and its Control; with a short Note on *A. atripennis*, Fb., by M. AFZAL HUSAIN, M.SC., M.A., and S. ABDULLAH SHAH, L.AG. Price, R 1 or 1*s*. 9*d*.

Vol. IX, No. V. Experiments on the Transmission of Rinderpest by means of Insects, by S. K. SEN, B.SC., F.E.S. Price, Rs. 2-4 or 4*s*. 2*d*.

Vol. IX, No. VI. Studies on Indian Thysanoptera, by DR. H. H. KARNY. Price, Re. 1-8 or 2*s*. 6*d*.

Vol. IX, Nos. VII—IX. New Species of Indian Gall Midges (*Itonididae*), by E. P. FELT; New Indian Geometridae, by LEWIS B. PROUT, F.E.S.; Description of *Laspeyresia stirpicola*, n. sp. (Lepidoptera), by E. MEYRICK, F.R.S., with a short Note on the Life-history and Status, by C. S. MISRA, B.A. Price, As. 5 or 6*d*.

Bacteriological Series

Vol. II, No. I. Nitrogen Fixation in the Punjab, by P. E. LANDER, M.A., D.SC., A.I.C., and BARKAT ALI, L.AG. Price, As. 8 or 10*d*.

Veterinary Series

Vol. III, No. VI. Nasal Granuloma in Cattle, by V. KRISHNAMURTI AYYAR, L.V.S. Price, R. 1 or 1*s*. 6*d*.

Vol. III, No. VII. Experiments on the treatment of Hookworm Infection in Dogs, by Amarnath Gulati, M.SC. (Punjab). (*In the press.*)

Vol. III, Nos. VIII & IX. On the occurrence of a Lung Fluke *Paragonimus Edwardsi*, by Amarnath Gulati, M.SC. (Punjab); On the occurrence of *Isospora* and *Balantidium* in Cattle by H. Cooper, M.R.C.V.S., and Amarnath Gulati, M.SC. (Punjab). (*In the press.*)

Bulletins issued by the Agricultural Research Institute, Pusa

No. 153. Tamarind as a source of Alcohol and Tartaric Acid, by H. N. BATHAM, M.A., and L. S. NIGAM, L.AG. Price, As. 3 or 4*d*.

No. 154. The Bionomics of the Sarcopic Mange Parasite of the Buffalo with some observations concerning the relative power of resistance to adverse conditions of the different stages of the Acarus and of its egg, by T. M. TIMONEY, M.R.C.V.S. Price, As. 2.

No. 155. List of Publications on Indian Entomology, 1923 (compiled by the Imperial Entomologist). Price, As. 11 or 1*s*.

No. 156. Bud and Boll Shedding in Cotton, by G. R. HILSON, B.SC., V. RAMANATHA AYYAR, L.AG., and R. CHOKKALINGAM PILLAI, L.AG. Price, As. 14 or 1*s*. 6*d*.

No. 157. The Experimental Sullage Farm, Lyallpur, by P. E. LANDER, M.A., D.SC., A.I.C. Price, As. 12 or 1*s*. 3*d*.

No. 158. A New Fodder (Siloed *Shisham* Leaves) for Dairy Cows, by P. E. LANDER, M.A., D.SC., A.I.C., and LAL CHAND DHARMANI, L.AG. Price, As. 6 or 8*d*.

No. 159. Preliminary Investigations in the Bacteriology of Milk, by J. H. WALTON, M.A., M.SC. Price, As. 6 or 8*d*.

No. 160. Bot Flies of the Punjab, by H. E. CROSS, M.R.C.V.S., D.V.H., A.SC. Price, As. 14 or 1*s*. 6*d*.

No. 161. Publications on Indian Entomology, 1924 (compiled by the Imperial Entomologist). Price, As. 8 or 9*d*.

Bulletins issued by the Agricultural Research Institute, Pusa—*contd.*

No. 162. Tentative Keys to the Orders and Families of Indian Insects, by T. BAINBRIGGE FLETCHER, B.N., F.L.S., F.E.S., F.Z.S. Price, R. 1-4 or 2*s.* 3*d.*

No. 163. Loss of Sugar by inversion in Sugar Factories in Northern India and its prevention by Antiseptic Measures, by C. M. HUTCHINSON, C.I.E., B.A., and C. S. RAMAYYAR, B.A. Price, As. 2 or 3*d.*

No. 164. Standard Methods of Analysis of Fertilizers, by J. SEN, M.A., Ph.D. Price, As. 4 or 6*d.*

No. 165. List of Publications on Indian Entomology, 1925 (compiled by the Imperial Entomologist, and the offg. Imperial Entomologist, Pusa). *(In the press.)*

Books

Wheat in India, by ALBERT HOWARD, M.A., A.R.C.S., F.L.S., and GABRIELLE L. C. HOWARD, M.A. Price, Rs. 5 or 7*s.* 6*d.*

A Description of the Imperial Bacteriological Laboratory, Muktesar; Its Work and Products, by MAJOR J. D. E. HOLMES, M.A., D.SC., M.R.C.V.S. Price, As. 8 or 9*d.*

Agriculture in India, by JAMES MACKENNA, M.A., I.C.S. Price, As. 4 or 5*d.*

Some Diseases of Cattle in India. A Handbook for Stock-owners. Price, As. 8 or 9*d.*

Report on the Diseases of Silkworms in India, by A. PRINGLE JAMESON, D.SC. Price, Rs. 3.

Notice

All new publications are included in the above list and are regularly posted to all on the mailing list as soon as issued. Unless complaints of non-receipt of any publication are received by the Manager, Government of India Central Publication Branch, 8, Hastings Street, Calcutta, within six months of the date of issue, duplicate copies can be supplied only on payment of cost and postage.

MGIPC—M—IV-2-84—25-10-26—650.